*Approved according to 2/FEA 209 544*

# Trouble-shooting instruction

# PF 768

# Standard electrical repairs

*4/00021-2/FEA 209 544/11.C*

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# 1 Conditions

## 1.1 Component classes.

All the components in the phone are divided into classes and after every component in the troubleshooting guide you have a class written. The components are divided into four classes: A, B, C and D.The class of the component depends on how much of the phone's performance is affected when replacing it.

**Class A and B:** A test call towards the "real" net (not only towards a GSM test instrument) and run it through the normal tests is enough to verify the functionality since the performance of the phone is only slightly affected.

**Class C:** Since the tolerances of the component are so great it can substantially affect the performance of the phone **you need to calibrate it at station level** after replacing the component.

**Class D:** Class D components **need to be calibrated** at **board level** using very advanced equipment and may therefore **not be replaced**.

## 1.2 Abbreviations.

A: The power module at some phones.

B: Crystal.

C: Capacitor.

D: Digital circuit.

F: Over voltage protection.

G: VCO.

H: Buzzer, LED, pads for display.

J: Connector.

L: Coil.

N: Analogue circuit.

R: Resistor.

S: Keyboard pads.

U: BALUN. A circuit that converts a signal from balanced to unbalanced or the opposite.

V: Transistor or diode.

X: Contact surface at the circuit board.

Z: Filter.

AGND: Ground for analogue signals.

DCIO: DC voltage used for charging the battery through the system connector.

DCON: Logical signal from the processor that keeps the phone running after you've released the On/Off key.

EXTAUD: Input signal at the system connector that the processor uses to determine if there's any external audio equipment attached.

EXTAUDI: The same signal as the EXTAUD signal but at the processor side.

GND: Ground.

LED3K: Logical signal used to activate the background illumination.

ONSRQ: Voltage from the On/Off key that starts the phone.

PORTHF: Input signal at the system connector that the processor uses to determine if there's any handsfree equipment attached.

PHF1: The same signal as PORTHF but at the processor side.

REGON: Logical signal that activates the voltage regulators.

RTC: Real time clock. The clock that keeps track of time and date.

SIMCLK: Clock signal from the processor used for communications with the SIM.

SIMDAT: Data signal from the processor used for communications with the SIM.

SIMRST: Reset signal from the processor used for communications with the SIM.

SIMVCC: Feed voltage for the SIM.

SWDC: Switched VBATT.

VANA: DC voltage for the analogue part of the logic (N800).

VBATT: Battery voltage.

VDIG: DC voltage for the processor and memory.

VDSP: DC voltage for the DSP (Digital Signal Processor).

VLCD: DC voltage for the display that controls the contrast.

VRAD: DC voltage for the radio part except the synthesizer.

VRPAD: DC voltage for the radio part in D600 (also used for the top diode and the buzzer).

VRTC: DC voltage for the real time clock.

VSIMPAD: VDIG voltage that has been switched up to 5V used for SIM.

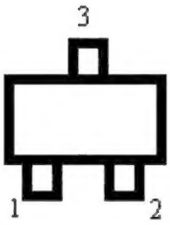
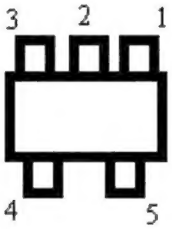
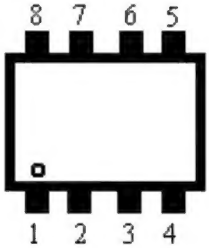
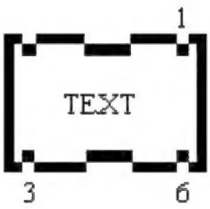
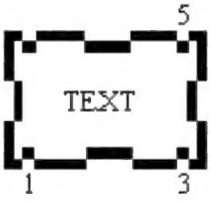
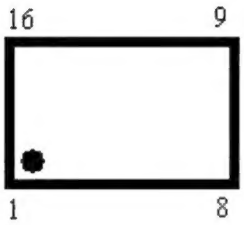
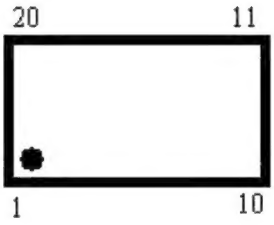
VVCO: DC voltage for the synthesizer.

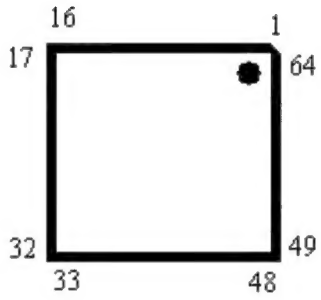
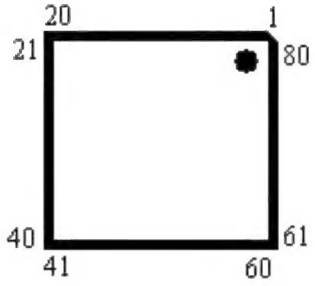
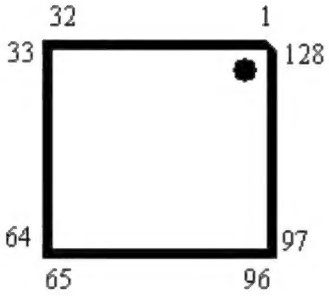
$I^2C$: Two line serial communications standard using one clock and one data line.

LO: Local oscillator.

PWM: Pulse width modulation.

## 1.3 Pin placements

| | | |
|---|---|---|
| | | |
| Single diode (PIN diode). | Electrolytic capacitor. | |
|  |  | |
| Double diode or single transtor. | Five pin circuit (usually voltage regulator). | Double transistor. |
|  |  |  |
| Eight pin circuit. | Tx VCO circuit (G300) | LO VCO circuit (G350) |
|  |  | |
| Sixteen pin circuit | Twenty pin circuit | Crystal |

| | |
|---|---|
|  |  |
| N800 | D900 |
|  | |
| D600 | |
| | |
| D620 | D610 |

# 2 No serv/not able to connect calls.

## 2.1 Finding out if the fault is Rx- or Tx-related.

Connect the phone (with signalling program) to a GSM test instrument and try to get serv at –68.5dBm signal strength.

- If the phone doesn't get serv, proceed to section 2.2.
- If the phone gets serv, proceed to section 2.3.

## 2.2 The phone doesn't get serv.

Open the phone and check for liquid damages.

Make sure the back cover is intact and that it's of the right model since there are two models available. Fig. 2.1 shows which back cover model to use.

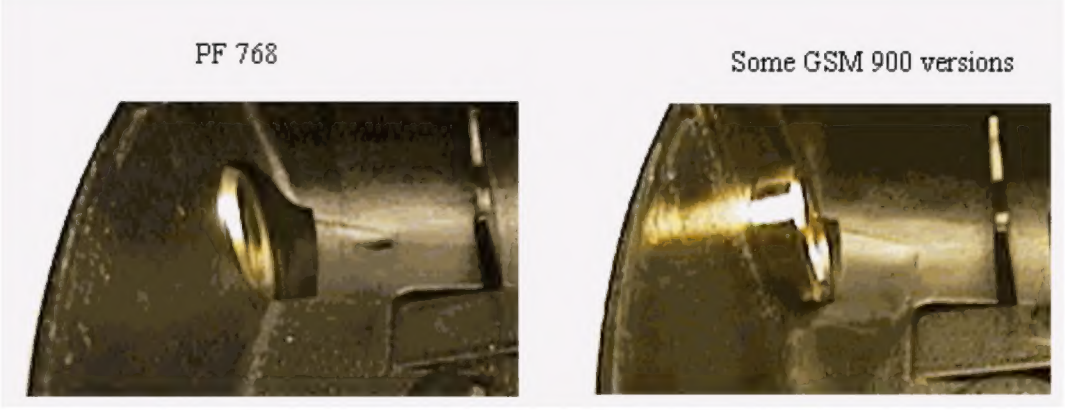



**Fig. 2.1**

Replace the antenna connector and try again. Note that there are several models of the antenna connector and it's important not to mount the wrong model. Fig. 2.2 shows which antenna connector model is to be used.

**Fig. 2.2**

- If the phone gets serv, proceed to section 2.3.
- If the phone doesn't get serv there is probably a LO-part fault or the losses in the signal path are too great. It's also possible it could be a feed voltage fault.

If the fault remains, send the phone to the next level.

## 2.3 Connect a call towards the GSM test instrument at power level 0 and –68.5dBm input signal strength.

If you're able to connect a call, proceed to section 2.4.

If you're not able to connect a call, open the phone and check for liquid damages.

Make sure the back cover is intact and of the correct model since there are 2 models (fig. 2.1).

Replace the antenna connector (if you haven't replaced it already) and try again. Note that there are several different models of the antenna connector too and it's important to mount the correct one.

- If you where able to connect a call, proceed to section 2.4.

The fault is probably Tx related or it's a feed voltage fault if you still aren't able to connect calls.

If the fault remains, send the phone to the next level.

## 2.4 Read the Rx-level value from the instrument while the call still is connected.

If the Rx-level value is at 42 2 steps, male sure the output power is 28-32dBm.

- The phone probably isn't faulty if that's correct.

Lower the signal from the instrument to –102.5dBm and make sure the Rx-level value is 4-12 steps and that the Rx-quality value is 0-2 steps.

Try running the phone through the test again.

- If the phone passes the test but isn't able to connect a call towards the "real" net, make sure the phone hasn't been **locked out of the system due to theft**. If it hasn't, replace D600 (class B, fig. 2.3).

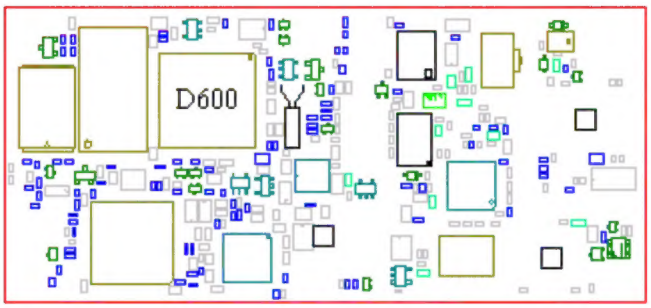



**Fig. 2.3**

If the output power is too low or if the Rx-quality value or the RX-level vaule is too high, send the phone to the next level.

If the Rx-level value is below 39 steps at –68.5dBm input signal strength or below 4 steps at –102.5dBm input signal strength, then the fault is Rx-related.

Open the phone and check for liquid damages.

Make sure the back cover is intact and that it's of the right model since there are two models available. Fig. 2.1 shows which back cover model to use.

Replace the antenna connector and try again. Note that there are several models of the antenna connector and you must mount the correct model. Fig. 2.2 shows which antenna connector model is to be used.

If the fault remains, send the phone to the next level.

# 3 Doesn't start.

## 3.1 Find out if the phone starts by pressing the On/Off key.

Insert a fully charged battery and press the On/Off key.

- If the phone doesn't start, proceed to section 3.2.
- If the phone starts, turn off the phone and check the charging function by connecting a charger into the system connector.

  * If the phone doesn't start or doesn't charge, send the phone to the next level.

  * If the phone starts (lights the background illumination, asks for SIM or PIN, seeks net...) and the charging function is ok then there's probably nothing wrong with the phone or the fault is intermittent.

Open the phone and make a visual check of the circuit board.

Check for eventual liquid damages at the circuit board and dirt or oxide at the system and battery connector pads.

Fig. 3.1 shows typical dirt at the battery connector pads.

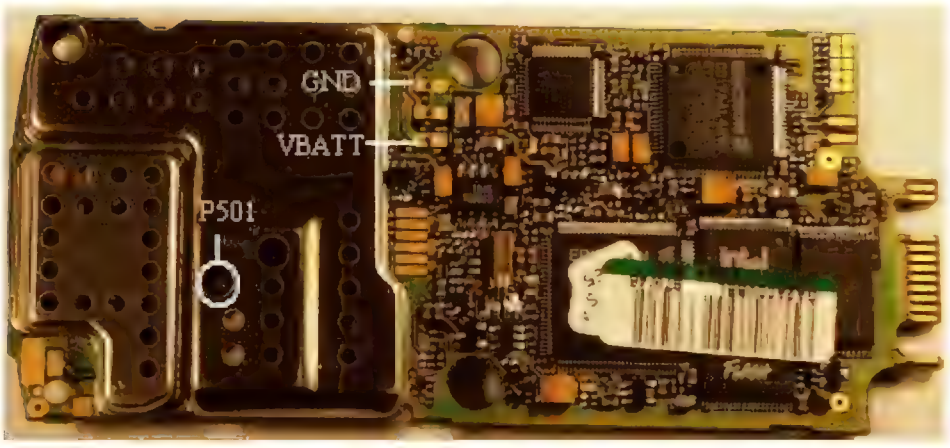



**Fig. 3.1**

Make sure the dome switches isn't damaged, especially at the On/Off key.

Make sure D600, D610 and D620 are soldered correctly (fig. 3.2).

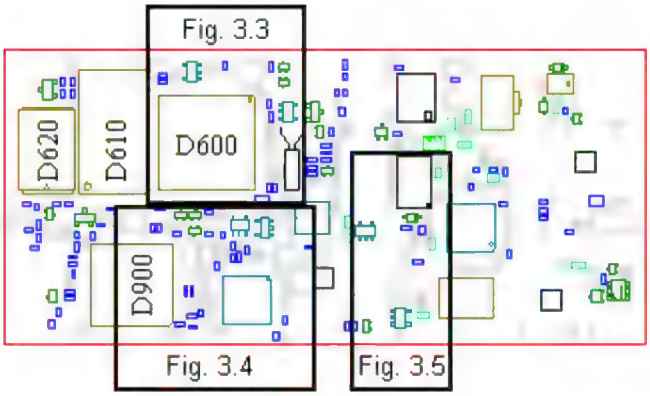



**Fig. 3.2**

Send the phone through the normal flow as soon as you've fixed the fault.

## 3.2 Visual check.

Make an outer visual check:

- Make sure the battery connector is intact and that there aren't any dirt or oxide at the connector pins.
- Make sure there's no dirt or oxide at the battery connector pads.
- Make sure the system connector isn't damaged or dirty.

Continue at 3.3.

## 3.3 Current consumption with the On/Off key pressed.

Insert a dummy battery into the phone.

- If the phone consumes current immediately, proceed to section 3.4.1.

Start the phone by pressing the On/Off key and check the current consumption.

- If the phone doesn't consume any current when you keep the On/Off key pressed it most probably is due to faulty dome switches.

Open the phone and remove the dome switches.

Make sure the board isn't liquid damaged or dirty, especially around the On/Off key. Dirt is washed away by using alcohol and a brush.

Mount a new dome switches (note that the board must be dry before mounting the dome switches).

Give the board power and start it up by pressing the On/Off key (in the fixture or in the back cover with a dummy battery inserted, mount system connector to make the board lie steady in the back cover).

* If the phone still doesn't consume any current when the On/Off key is pressed, proceed to section 3.4.2.

- If the phone consumes more than 200mA, remove the display and try again.

  * If the consumption decreased it was the display that was faulty.

  * If the consumption still is high, proceed to section 3.4.3.

- If the phone consumes 1-200mA, starts (asks for SIM, seeks net...) and runs as long as you keep the On/Off key pressed but dies when you release the key, proceed to section 3.4.4.

- If the phone doesn't start, try to program it in the flash programmer.

  * If the phone doesn't start in the flash programmer, proceed to section 3.4.5.

  * If you can program the phone but it doesn't start afterwards or if the phone is troublesome in the flash programmer, proceed to section 3.4.6

  * If the phone starts once it's programmed in the flash programmer it probably isn't a faulty phone. To eliminate intermittent faults, check the board for liquid damages and check if the D600, D610 and D620 (fig. 3.2) chips are correctly soldered.

## 3.4 Measuring a powered board.

### 3.4.1 Consumes power immediately when battery is inserted.

Open the phone and check for liquid damages.

Make sure the battery and system connector pads aren't liquid damaged, dirty or oxidised.

Remove the dome switches. Clean the keypads using alcohol and a brush.

Put the board in the fixture without starting it up.

Measure the VDIG, VANA, VDSP, VRAD, VVCO and VRPAD feed voltages (~0V).

Fig. 3.1 shows the measuring point for VRAD (P501) and fig. 3.3 show the measuring point for VDIG.

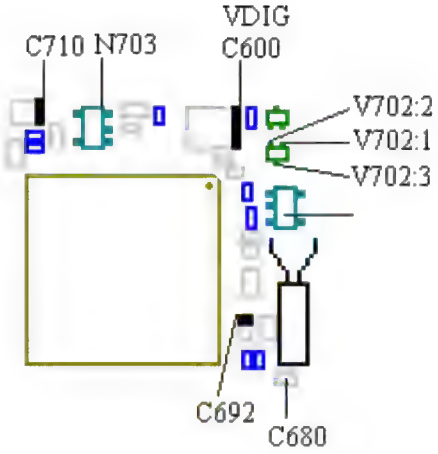



**Fig. 3.3**

Fig. 3.4 shows the measuring point for VANA and VDSP.

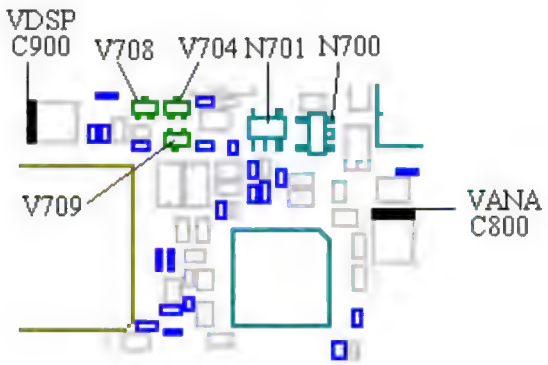



**Fig. 3.4**

Fig. 3.5 shows the measuring point for VRPAD and VVCO.

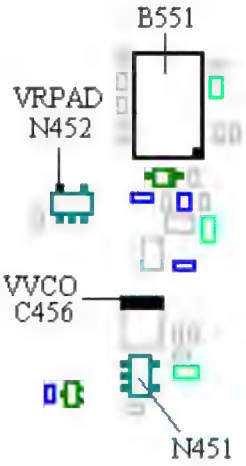



**Fig. 3.5**

Since the measuring point for VVCO is under the big radio shielding (E202) you have to measure the voltage carefully through one of the holes with a thin and preferably isolated probe as in fig. 3.6.

**Fig. 3.6**

- If there is voltage at any of the voltages but not all, replace the corresponding regulator (VDIG – N702, VANA – N700, VDSP – N701, VRAD – N453, VVCO – N451, VRPAD – N452, all of them class A). **Note that the N453 and N451 regulators are under the radio shieldings and can therefore not be replaced at this level.**
- If there is voltage at all of the regulators, measure REGON at V702 pins 2 and 3 (fig. 3.3, ~0V).

  * The REGON signal probably comes from one of the regulators or from V704, V708 or V709 (fig. 3.4) if there's no voltage at V702 pins 2 and 3. Replace a component at a time and check after every component replaced.

  * If there's voltage at both pin 2 and pin 3 or V702 there's probably a short circuit at the pads for the On/Off key. It's almost always crumbs from the dome switches that causes this short circuit. Wash it away using alcohol and a brush.

If the fault remains, send the phone to the next level.

### 3.4.2 Consumes no current when On/Off key is being pressed.

Open the phone and check for liquid damages.

Make sure the battery and system connector pads aren't dirty, liquid damaged or oxidised.

Give the board power and start it up by pressing the On/Off key (in the fixture or in the back cover with a dummy battery inserted, mount system connector to make the board lie steady in the back cover).

Check the current consumption.

- If the phone still doesn't consume any current, measure the resistances from the **unmarked** side of the "No" keypad (fig. 3.7) to pin 2 of V702 (~0 ohms, fig. 3.3) and from pin 3 of V702 to pin 3 if N702 (~0 ohms, fig. 3.3).

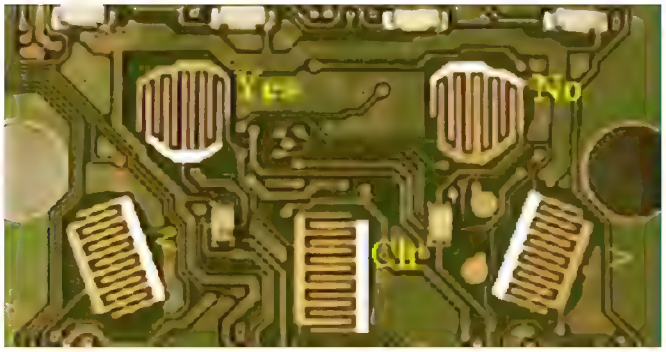



**Fig. 3.7**

* If one or both of the resistances are too high there's a foil damage and the phone is to be discarded.

* If the resistances are correct, replace V702 (class A).

If the fault remains, send the phone to the next level.

## 3.4.3 Consumes more than 200mA.

Open the phone and check for liquid damages.

Make sure the battery and system connector pads aren't dirty, liquid damaged or oxidised.

Place the board in the fixture. Keep it running by keeping DCIO high.

Check the VDIG, VANA and VDSP voltages (~3.2V, fig. 3.3 and 3.4).

- If any of the voltages are too low, measure the resistance from it to ground (VDIG>500 ohms, VANA>25 kohms, VDSP>25kohms).

  * If the resistance is correct, replace the corresponding regulator (VDIG – N702, VANA – N700, VDSP – N701, all of class A).

  * If the resistance is too low there's a short circuit in one of the circuits fed by the regulator. Send the phone to the next level.

- If any of the voltages are too high, replace the corresponding regulator.

Check the VRAD (fig. 3.1, P501 measuring point), VVCO (fig. 3.5) and VRPAD (fig. 3.5) voltages (all of them ~3.8V).
*Note that P501 is a calibration point. It is VRAD you measure but after 2 resistors. The calibration point has the right voltage as long as the transmitter isn't activated.*

*Also note that the measuring point for VVCO is under the big radio shielding (E202) and therefore you have to measure the voltage carefully through one of the holes with a thin and preferably isolated probe as in fig. 3.6.*

- If the VRAD or VVCO voltage is incorrect, send the phone to the next level.
- If the VRPAD voltage is too low, measure the resistance from it to ground (>25 kohms).

  * If the resistance is correct, replace N452 (class A)..

  * If the resistance is too low there's a short circuit in one of the circuits fed by the regulator. Send the phone to the next level.
- If the VRPAD voltage is too high, replace N452.

Measure the resistance from VBATT to ground (>200 kohms, fig. 3.1).

- If the resistance is too low there's a short circuit in one of the circuits fed by VBATT. Send the phone to the next level.

If the fault remains, send the phone to the next level.

### 3.4.4 The phone runs as long as the On/Off key is pressed.

Open the phone and check for liquid damages.

Make sure the battery and system connector pads aren't dirty, liquid damaged or oxidised.

Place the board in the fixture. Keep the board running by keeping the On/Off key pressed.

Measure the voltage at C692 (~3.1V, fig. 3.3).

- If there is voltage, make sure pin 119 of D600 is correctly soldered.

  * If the soldering is correct, replace D600 (class B, fig. 3.2).
- If there is no voltage at C692, measure the resistance of C692 (class A, >200 kohms).

  * If the resistance is too low, replace C692 and check the voltage again.

  * If the resistance is correct, check the voltages at N706 (fig. 3.8). VBATT at pin 2, ground at pin 1 and the output voltage (~3.5V) at pin 3.

    * If VBATT or ground is missing there's a foil damage and the phone is to be discarded.

    * If VBATT and ground are correct but not the output voltage, replace N706.

* If all the voltages are correct, measure the VRTC voltage between the positive side of C720 (class A, ~3.1V, fig. 3.8) and ground.

* If there's no VRTC voltage, replace V711 (class A, fig. 3.8).

* If there's VRTC voltage, measure the resistance from the positive side of C720 (fig. 3.8) to the marked side of C692 (fig. 3.3, ~0 ohms).

* If the resistance is too high there's a foil damage and the phone is to be discarded.

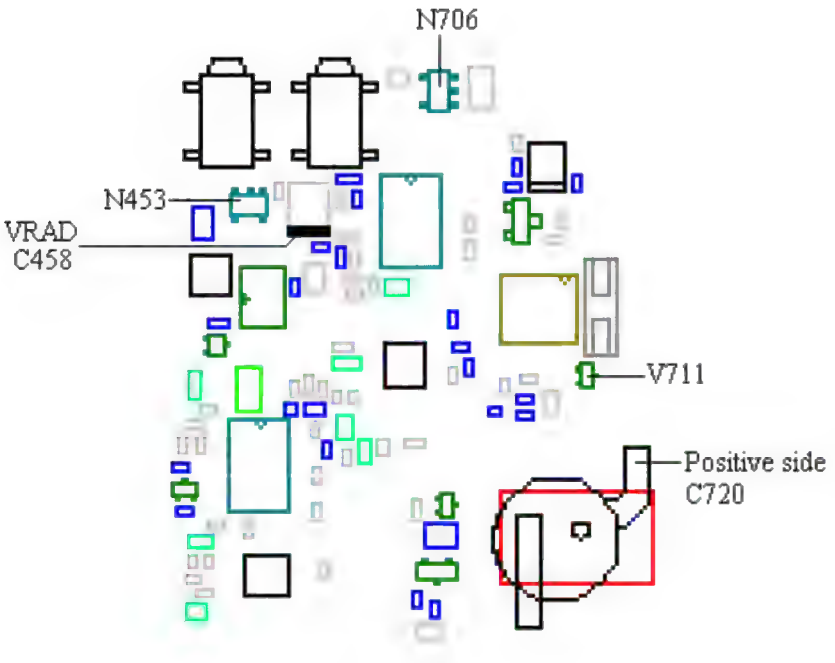



**Fig. 3.8**

If the fault remains, send the phone to the next level.

## 3.4.5 Doesn't start in the flash programmer.

Open the phone and check for liquid damages.

Make sure the battery and system connector pads aren't dirty, liquid damaged or oxidised.

Place the board in the fixture. Keep the board running by keeping DCIO high.

Check the VANA and VDIG voltages (~3.2V, fig. 3.4 and 3.3).

- If any of the voltages are too low, measure the resistance from it to ground (VDIG>500 ohms, VANA>25 kohms).

  * If the resistance is correct, replace the corresponding regulator(VDIG – N702, VANA – N700, both of class A).

* If the resistance is too low there's a short circuit in one of the circuits fed by the regulator. Send the phone to the next level.

- If any of the voltages are too high, replace the corresponding regulator.

Check the power reset voltage at C710 (fig. 3.3, >3V).

- If it's too low, replace C710 (class A) and measure again.

  * If that doesn't help, replace N703 (class A, fig. 3.3).

Check the VRAD (fig. 3.1, P501 measuring point), VVCO (fig. 3.5) and VRPAD (fig. 3.5) voltages (all of them ~3.8V).
*Note that P501 is a calibration point. It is VRAD you measure but after 2 resistors. The calibration point has the right voltage as long as the transmitter isn't activated. Also note that the measuring point for VVCO is under the big radio shielding (E202) and therefore you have to measure the voltage carefully through one of the holes with a thin and preferably isolated probe as in fig. 3.6.*

- If the VRAD or the VVCO voltage is incorrect, send the phone to the next level.
- If the VRPAD voltage is too low, measure the resistance from it to ground (>25 kohms).

  * If the resistance is correct, replace N452 (class A).

  * If the resistance is too low there's a short circuit in one of the circuits fed by the regulator. Send the phone to the next level.

- If the VRPAD voltage is too high, replace N452.

- If all the feed voltages are correct, check the amplitude of the clock frequency at C680 (class A, >0.6V t-t, fig. 3.3). To check the amplitude you can use an oscilloscope, spectrum analyser, frequency counter, diode probe or similar. The D900 circuit usually gets warm when the system clock frequency is missing.

  * If the amplitude is too low, send the phone to the next level.

Make sure there aren't any faulty solderings at D600, D610 or D620 (fig. 3.2).

- If they look ok, replace D610 (class A). **Do not replace any component if you haven't established the fact that the amplitude at C680 is correct.**

  * If that doesn't help, replace D600 (class B) first and then D620 (class A) if that doesn't help. *Try programming the phone in the flash programmer after every circuit replaced.*

If the fault remains, send the phone to the next level.

### 3.4.6 Able to program the phone but it doesn't start afterwards or it is troublesome in the flash programmer.

Open the phone and check for liquid damages.

Make sure the battery and system connector pads aren't dirty, liquid damaged or oxidised.

Place the board in the fixture. Keep the board running by keeping DCIO high.

Check the VANA and VDIG voltages (~3.2V, fig. 3.4 and 3.3).

- If any of the voltages are too low, measure the resistance from it to ground (VDIG>500 ohms, VANA>25 kohms).

  * If the resistance is correct, replace the corresponding regulator (VDIG – N702, VANA – N700, both of class A).

  * If the resistance is too low there's a short circuit in one of the circuits fed by the regulator. Send the phone to the next level.

- If any of the voltages are too high, replace the corresponding regulator.

Check the VRAD (fig. 3.1, P501 measuring point), VVCO (fig. 3.5) and VRPAD (fig. 3.5) voltages (all of them ~3.8V).
*Note that P501 is a calibration point. It is VRAD you measure but after 2 resistors. The calibration point has the right voltage as long as the transmitter isn't activated. Also note that the measuring point for VVCO is under the big radio shielding (E202) and therefore you have to measure the voltage carefully through one of the holes with a thin and preferably isolated probe as in fig. 3.6.*

- If the VRAD or the VVCO voltage is incorrect, send the phone to the next level.
- If the VRPAD voltage is too low, measure the resistance from it to ground (>25 kohms).

  * If the resistance is correct, replace N452 (class A).

  * If the resistance is too low there's a short circuit in one of the circuits fed by the regulator. Send the phone to the next level.

- f the VRPAD voltage is too high, replace N452.

Make sure there aren't any faulty solderings at D600, D610 or D620 (fig. 3.2).

- If they look ok, replace D610 (class A).

  * If that doesn't help, replace D600 (class B) first and then D620 (class A) if that doesn't help. *Try programming the phone in the flash programmer after every circuit replaced.*

If the fault remains, send the phone to the next level.

# 4 Audio.

## 4.1 Type of fault.

Make a call from the phone that is to be tested (later called the phone) to a phone that is working correctly (later called the reference phone).

Check the function of the microphone and the earphone.

Connect a handsfree unit to the system connector of the phone.

Check the function of the phone's external connections by listening to the external speaker/earphone when talking in the reference phone and by listening to the earphone of the reference phone when talking in the external mic of the phone.

- If there is low or no sound in the earphone of the phone, proceed to section 4.2.
- If both the earphone and the handsfree speaker don't work, send the phone to the next level.
- If the sensitivity of the microphone is low (low or no sound in the reference phone), proceed to section 4.3.
- If both the microphone in the phone and the microphone of the handsfree don't work, send the phone to the next level.
- If both the microphone and the earphone don't work, proceed to section 4.4.
- If the microphone, the earphone and the handsfree don't work, send the phone to the next level.
- If the microphone of the handsfree doesn't work, proceed to section 4.5.
- If the speaker of the handsfree doesn't work, proceed to section 4.6.
- If both the microphone and the speaker of the handsfree don't work, proceed to section 4.7.
- If the phone sounds strange (the sound is distorted, scrambled, full of static or "chopped"), proceed to section 4.8.

## 4.2 Earphone out of order.

Open the phone and check for liquid damages.

Most of the earphone faults are mechanical. Therefore you should start with replacing the front (with the earphone) to one you know works and try again.

- If the fault remains, make sure the earphone connector (X810, fig. 4.1) isn't faulty or incorrectly soldered.

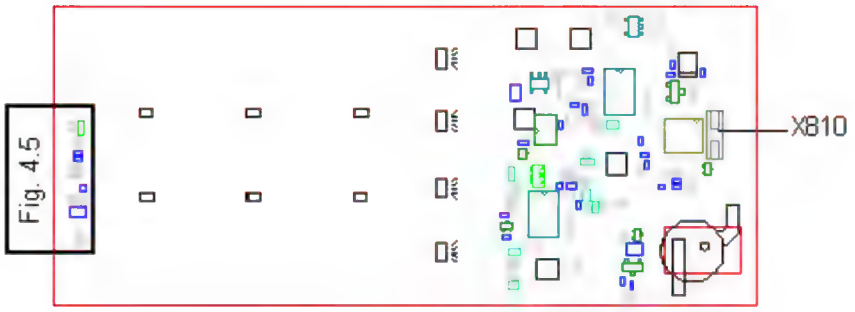



**Fig. 4.1**

Check the solderings of N800 (fig. 4.3).

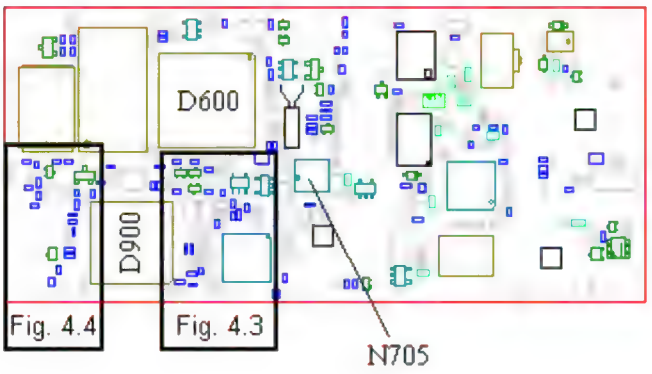



**Fig. 4.2**

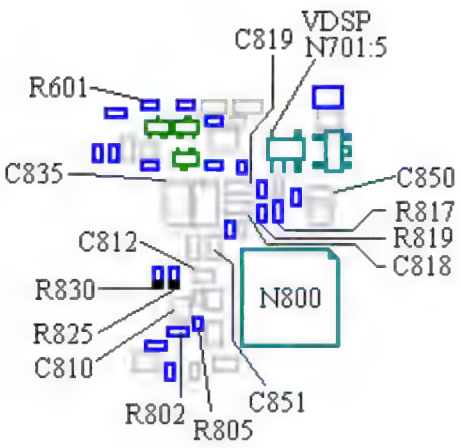



**Fig. 4.3**

If the fault remains, send the phone to the next level.

## 4.3 Microphone out of order.

Open the phone and check for liquid damages.

Wash the system and microphone connector pads if needed.

Make sure the sound channel gasket is properly mounted and free from dust.

Replace the system connector and microphone with a pair you know work. Test the phone again.

- If the fault remains, measure the resistance of C850 and C851 (both >100 kohms, class A, fig. 4.3). Measure the resistance of R816 (~470 ohms, fig. 4.4, class A), R817 and R819 (~1 kohms, class A, fig. 4.3). Check the solderings of N800 (fig. 4.3).

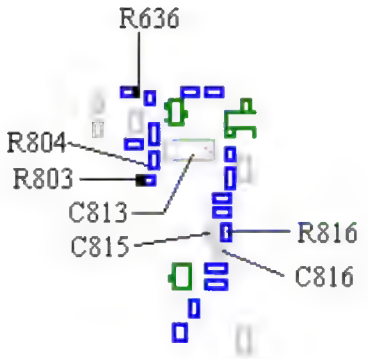



**Fig. 4.4**

If the fault remains, send the phone to the next level.

## 4.4 Both the earphone and the microphone of the phone out of order.

Open the phone and check for liquid damages.

Make especially sure there's no dirt or oxide between the components below the dome switches (fig. 4.5) and at the system connector pads.

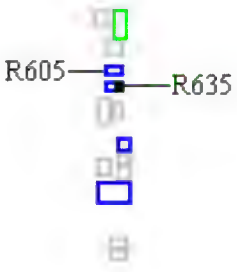



**Fig. 4.5**

Wash the circuit board if needed using alcohol and a brush.

Assemble the phone and test it as in 4.1.

If the fault remains, open the phone. Give the board power and start it up by pressing the On/Off key without the system cable connected.

Measure the VDSP (~3.2V, fig. 4.3) feed voltage.

- If the VDSP voltage is too low, replace N701 (class A, fig. 4.3).
- If the VDSP voltage still is too low after replacing the N701 circuit there is probably a short circuit in one of the components fed by the VDSP voltage regulator. If that's the case, send the phone to the next level.

Measure the voltage at both sides of R601 and at D600 pin 70 (~5V, fig. 4.3 and 4.2, you follow the **PHFI** signal).

Measure the voltage at both sides of R605 and at D600 pin 67 (~5V, fig. 4.5 and 4.2, you follow the **EXTAUDI** signal).

- If the voltage at **only one side** of R601 or R605 is **too low**, replace the corresponding resistor (fig. 4.3 and 4.5, both of class A).
- If the voltage is too low at both sides of R601 or R605, check the VSIMPAD voltage at marked sides of R635 and R636 (~5V, fig. 4.4 and 4.5).

  * If there's no voltage there, check the resistance from the marked side of R635 or R636 to N705 pin 3 (~0 ohms, fig. 4.5/4.4, 4.2).

    * If the resistance is too high there's a foil damage and the phone is to be discarded.

    * If the resistance is correct, proceed to section 6.3.

  * If the VSIMPAD voltage is correct, measure the resistances of R635 and R636 (~22 kohms, fig. 4.4 or 4.5).

    * If any of the resistances are incorrect, replace the corresponding resistor.

Measure the resistance from X602 pad 5 to ground (>100 kohms, fig. 4.6). Make sure there's no dirt or oxide between the components below the dome switches (the components in fig. 4.5).

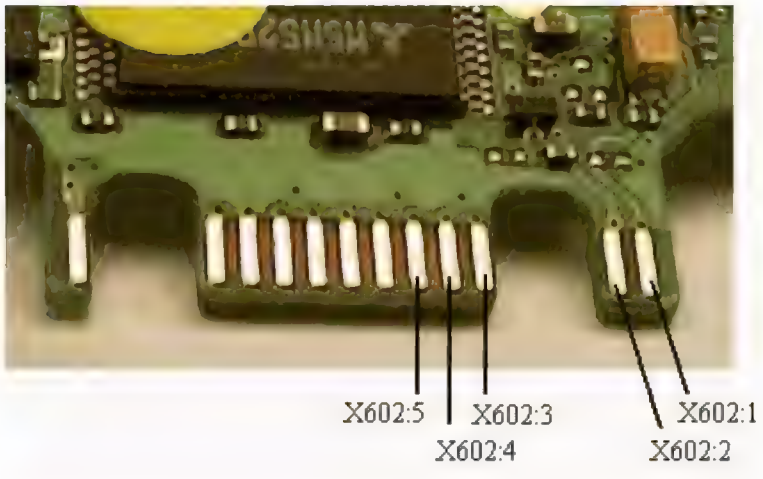



**Fig. 4.6**

- If the resistance is too low, wash carefully and measure again.

  * If the resistance still is too low, remove R601 (class A, fig. 4.3) and measure again.

    * If the resistance increased, replace D600 (class B, fig. 4.2).

    * If the resistance didn't increase when removing the R601 resistor or if it didn't help to replace D600, send the phone to the next level.

Measure the resistance from X602 pad 3 to ground (>100 kohms). Make sure there's no dirt or oxide between the components at the marked area (fig. 4.8).

- If the resistance is too low, wash carefully and measure again.

  * If the resistance still is too low, remove R605 (class A, fig. 4.5) and measure again.

    * If the resistance increased, replace D600 (class B, fig. 4.2).

    * If the resistance didn't increase or if it didn't help to replace D600, send the phone to the next level.

If all of the above measured resistances are correct but anyone of the voltages at R601 or R605 are too low anyway, it usually is because of a short circuit caused by dirt between the components in fig. 4.5.

If the voltages at R601 and R605 are correct, connect a handsfree to the system connector.

Measure the voltage at both sides of R601 (~0V, fig. 4.3) and at D600 pin 70 (~0V, fig. 4.2).

- If the voltage isn't correct, check the soldering at D600 pin 70 (fig. 4.2).

  * If the soldering is correct, measure the resistance of R601 (~1 kohms, class A).

* If the resistance is correct, replace D600 (class B).

- If the voltage is correct, check the solderings of N800 and D600 (fig. 4.3 and 4.2).

If the fault remains, send the phone to the next level.

## 4.5 Handsfree microphone out of order.

The fault occurs when there's an interrupt in the audiopath between the handsfree microphone (connected through the system connector) and the N800. The audio path is shown in fig. 4.7.

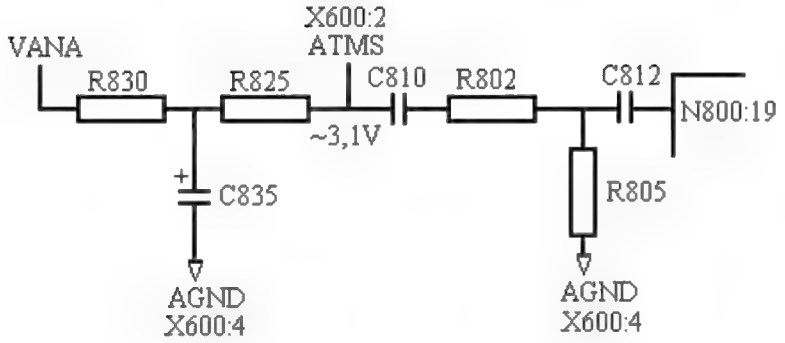



**Fig. 4.7**

Open the phone and check for liquid damages, especially around the system connector pads (X602) 1, 2 and 4 (fig. 4.6).

Measure the resistance of C850 and C851 (both >100 kohms, fig. 4.3, class A).

Make sure all the components in fig. 4.7 (R830, R825, R802, R805, C835, C810 and C812) are mounted on the circuit board (fig. 4.3).

Check the solderings of N800 (fig. 4.3).

Give the board power and start it up by pressing the On/Off key without the system cable connected.

Measure the voltage at the marked side of R825 (~3.1V, fig. 4.3).

- If there isn't any voltage or if it is incorrect, check the VANA voltage at the marked side of R830 (fig. 4.4).

  * If the VANA voltage is incorrect, proceed to chapter 3 ("Doesn´t start"-fault).

  * If VANA is correct, check the resistances of R830 (~470 ohms), R825 (3.3 kohms) and C835 (>1 kohms, all of class A and in fig. 4.3).

- If there's correct voltage at R825, check the resistance of C810 (>10 kohms), C812 (>100 kohms), R802 (~3.9 kohms) and R805 (~15 kohms, all of class A and in fig. 4.3).

If the fault remains, send the phone to the next level.

## 4.6 Handsfree speaker out of order.

The fault occurs when there's an interrupt in the audio path from the N800 to the handsfree speaker (connected through the system connector). The audio path is shown in fig. 4.8.

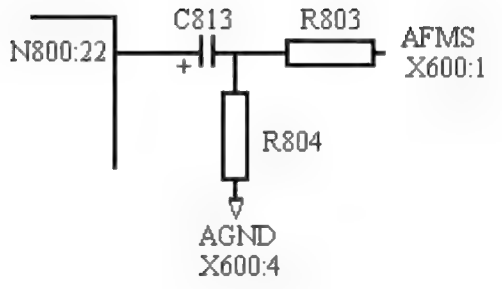



**Fig. 4.8**

Open the phone and check for liquid damages, especially around the system connector pads (X602, fig. 4.6) 1, 2 and 4.

Measure the resistance of C850 and C851 (both >100 kohms, both of class A and in fig. 4.3).

Make sure all the components in fig. 4.8 (R803, R804 and C813) are mounted at the circuit board (fig. 4.4).

Check the solderings of N800 (fig. 4.3).

Measure the resistances of R803 (~100 ohms), R804 (~100 kohms) and C813 (>100 kohms, all of class A and in fig. 4.4).

Measure the resistance from the marked side of R803 to pad 1 of X602 (~0 ohms, fig. 4.4 and 4.6).

- If the resistance is too high there's a foil damage and the phone is to be discarded.

If the fault remains, send the phone to the next level.

## 4.7 Both the microphone and the speaker of the handsfree out of order.

Open the phone and check for liquid damages, especially at the components in fig. 4.5.

Wash the above mentioned components using alcohol and a brush.

Measure the resistance from X602 pad 3 to the unmarked side of R635 (~0 ohms, fig. 4.6 and 4.5).

Measure the resistance from X602 pad 2 to the unmarked side of R636 (~0 ohms, fig. 4.6 and 4.4).

- If any of the resistances are incorrect there's a foil damage and the phone is to be discarded.

Measure the resistances of R601 and R605 (~1 kohms, class A, fig. 4.3 and 4.5).

If all the resistances are correct, check the solderings of N800 and D600 (fig. 4.3 and 4.2).

If the fault remains, send the phone to the next level.

## 4.8 The phone sounds strange (the sound is distorted, scrambled, full of static or "chopped").

Open the phone and check for liquid damages.

Give the board power and start it up by pressing the On/Off key.

Measure the VDSP feed voltage (~3.2V, fig. 4.3).

- If the VDSP voltage is too low, replace N701 (class A, fig. 4.3).

  * If the VDSP voltage still is too low after replacing the N701 circuit there is probably a short circuit in one of the components fed by the VDSP voltage regulator. If that's the case, send the phone to the next level.

- If the voltage is correct, check the solderings of N800 and D600 (fig. 4.3 and 4.2).

If the fault remains, send the phone to the next level.

# 5 Display.

## 5.1 Kind of fault.

Insert a charged battery into the phone and start it up by pressing the On/Off key.

- If it doesn't start, proceed to chapter 3 ("Doesn´t start"-fault).
- If the display is missing one or more segments, proceed to section 5.2.
- If there's nothing being displayed in the display or if the contrast is low, proceed to section 5.3
- If the display is black (all the segments are "lit" and you can sometimes make out what it's displaying), proceed to section 5.4.

## 5.2 Segments are missing.

Open the phone and check for liquid damages. Replace the display.

## 5.3 There's nothing showing in the display or the contrast is low.

Insert a dummy battery into the phone, start it up and check the current consumption. You could also disassemble the phone, place the board in the fixture, give the board power, start it up by pressing the On/Off key or by pulling DCIO high and check the current consumption.

- If the phone consumes more than 200mA, make sure the display isn't mechanically damaged.
  * If the display is ok, replace the elastomer and try again.
    * If that doesn't help, replace the display and try again.
      * If the current consumption still is too high, proceed to chapter 3 ("Doesn´t start"-fault).
- If the phone consumes less than 200mA, open the phone and check for liquid damages.

Give the board power and start it up without the display mounted.

The component side of the circuit board is shown in fig. 5.1.

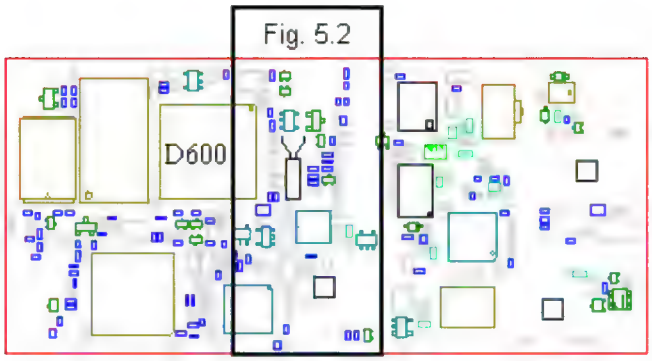



**Fig. 5.1**

Measure the voltages at the V608 diode (class A). Compare the results to the values at fig. 5.2.

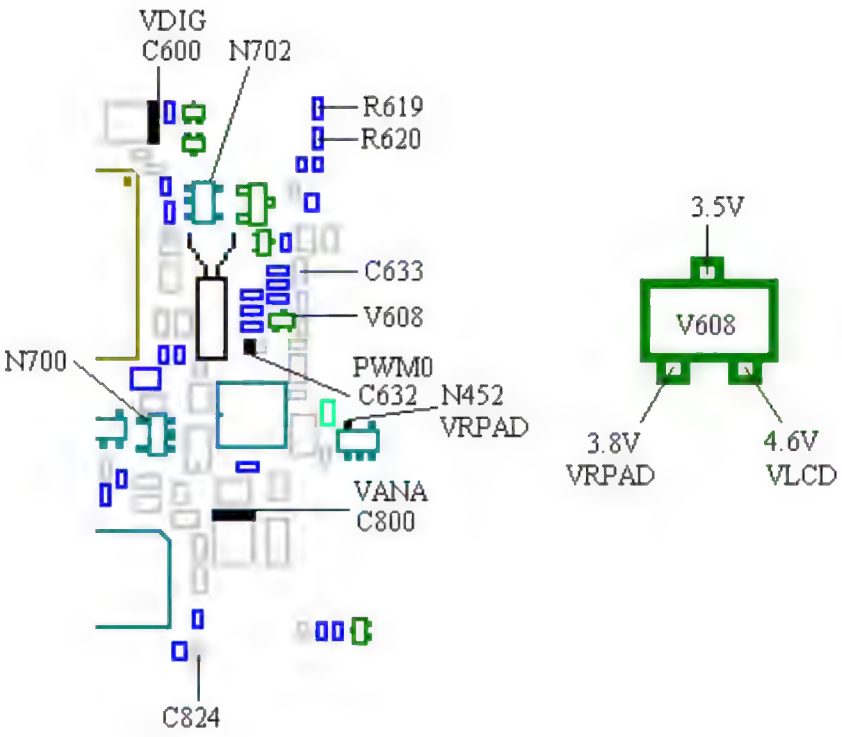



**Fig. 5.2**

All values are approximately 0.2V

- If any of the voltages differ from the ones in fig. 5.2, measure the resistances of C633 (class A, >100 kohms, fig. 5.2) and C824 (class A, >25 kohms, fig. 5.2).

  * If any of the resistances are too low, replace the corresponding capacitor.

* If the resistances and the VRPAD voltage are correct, replace the V608 diode.

* If the voltages at the diode (except VRPAD) still are incorrect after replacing it, make sure pin 96 of D600 is correctly soldered.

* If the soldering is correct, replace C632 (class A, fig. 5.2) and measure the voltages again.

* If that doesn't help, replace D600 (class B).

- If the VRPAD voltage is incorrect, proceed to chapter 3 ("Doesn´t start"-fault).

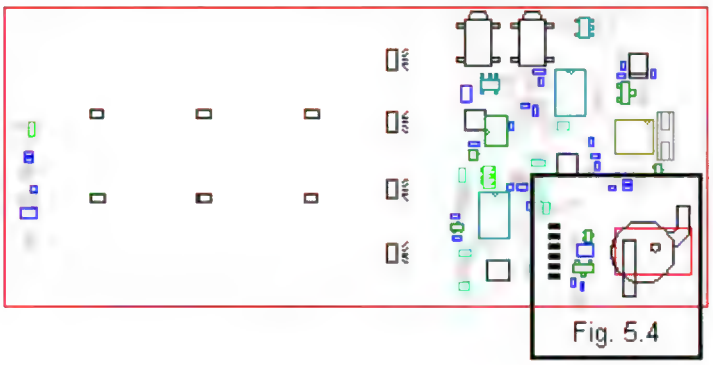



**Fig. 5.3**

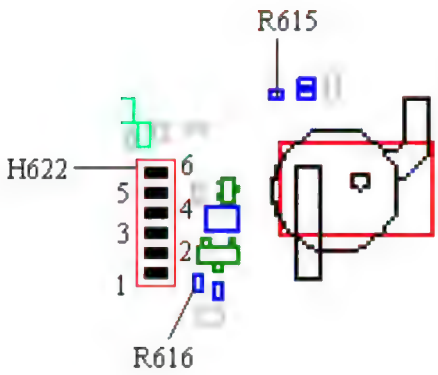



**Fig. 5.4**

- If the voltages at V608 are correct but there still isn't anything showing in the display, measure the voltages at the display pads (H622, fig. 5.4).

Pad 1 – ($I^2C$-CLOCK): ~3.2V
Pad 2 – ($I^2C$-DATA): ~3.2V
Pad 3 – (VDIG): ~3.2V
Pad 4 – (VDIG): ~3.2V
Pad 5 – (GND)
Pad 6 – (VLCD): ~4.6V

Make sure there's VLCD voltage (~4.6V) at pad 5.

- If there isn't, check the resistances from H622 pad 6 to V608 (the VLCD marked pin in fig. 5.2, ~0 ohms) and from pad 5 of H622 to ground (~0 ohms).

  * If any of the resistances are too high there's a foil damage and the phone is to be discarded.

- If the $I^2C$-DATA or the $I^2C$-CLOCK voltage is missing, check the VDIG voltage at C600 (~3.2V, fig. 5.2)

  * If the VDIG voltage is incorrect, proceed to chapter 3 ("Doesn´tstart"-fault).

  * If the VDIG voltage is correct, measure the resistances of R619 (~2.2 kohms, fig. 5.2), R620 (~2.2 kohms, fig. 5.2), R615 (~10 kohms, fig. 5.5) and R616 (~10 kohms, fig. 5.5, all of class A). Check the solderings of D600 pins 3 and 4 (fig. 5.1).

    * If all the resistances and the solderings are correct, replace D600 (class B).

## 5.4 The display is black (all the segments are "lit" and you can sometimes make out what it's displaying).

Open the phone and check for liquid damages.

Give the board power and start it up by pressing the On/Off key. If the phone shuts itself down after a few minutes, keep it running by keeping DCIO high.

Check the VDIG and VANA voltages (~3.2V, fig. 5.2).

- If any of the voltages are too low, measure the resistance from it to ground (VDIG>500 ohms, VANA>25 kohms).

  * If the resistance is correct, replace the corresponding circuit (VDIG – N702, VANA – N700, both of class A).

  * If the resistance is too low there's a short circuit in one of the circuits fed by the regulator. Send the phone to the next level.

- If any of the voltages are too high, replace the corresponding regulator.

If the fault remains, proceed to section 5.3 (nothing shows in the display or the display has low contrast).

# 6 SIM ("Insert card").

## 6.1 What is SIM fault?

Insert a charged battery and a functional SIM card into the phone. Start it up by pressing the On/Off key.

- If the phone displays **"Wrong card"** or **"Insert correct card"** in the display it means that the phone is SIM-locked and it can't be repaired at this level.
- If the phone displays **"Phone lock"** it means that the customer has locked the phone with a personal code. The phone is unlocked in the reset part of the test flow.
- If the phone displays **"PIN:"** or **"Enter PIN"** it means that the SIM card is locked with a personal code.
- Only if the phone displays **"Insert card"** there's a SIM fault.

## 6.2 Measuring VSIMPAD.

Measure the voltage between pin 8 and 10 of the system connector (~4.9V, fig. 6.1).

- If the voltage is too low or missing, proceed to section 6.3.
- If the voltage is correct, proceed to section 6.4.

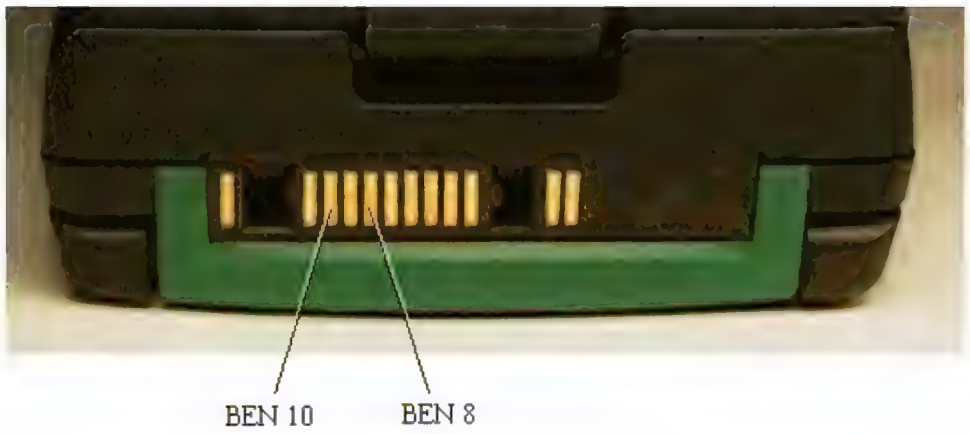



**Fig. 6.1**

## 6.3 VSIMPAD voltage too low or missing.

Open the phone and check for liquid damages, especially around the system connector pads.

Measure the resistance of R724 (class A, ~47 ohms, fig. 6.2).

**Fig. 6.2**

Give the board power and start it up. Measure the input voltage at N705 pin 2 (~3.1V, fig. 6.4).

Fig. 6.3 shows the component side of the board.

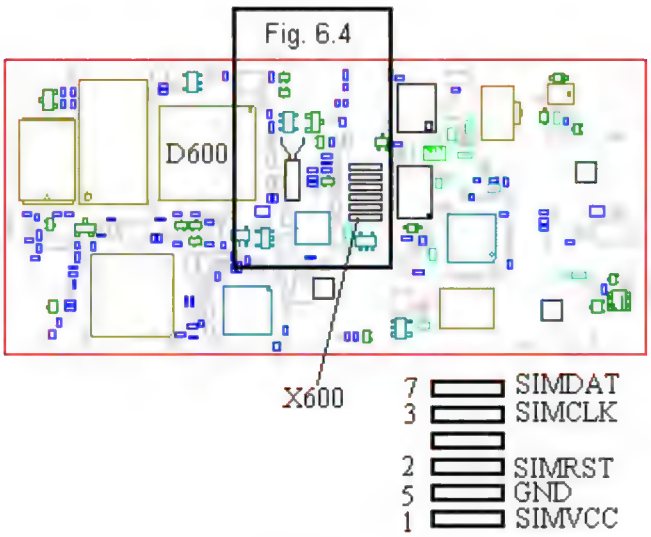



**Fig. 6.3**

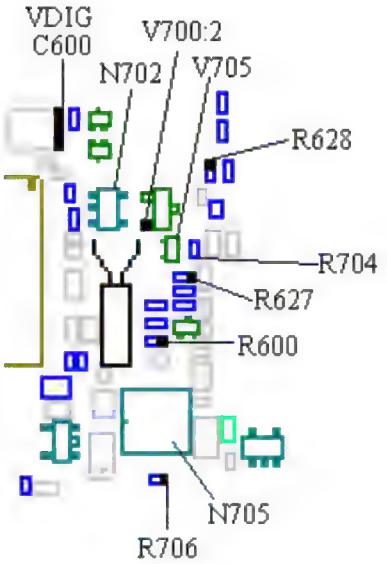



**Fig. 6.4**

- If the input voltage is too low or missing, check the VDIG (~3.2V) feed voltage at C600 (fig. 6.4).

  * If the VDIG voltage is too low, measure the resistance from it to ground.

    * If the resistance is more than 500 ohms, replace N702 (class A, fig. 6.4).

    * If it's less, send the phone to the next level.

  * If the VDIG voltage is correct, measure the resistance of R706 (class A, ~4.7 ohms, fig. 6.4).

    * If the resistance is correct, check the resistance from the marked side of R706 to the marked side of C600 (~0 ohms) and from the unmarked side of R706 to pin 2 of N705 (~0 ohms).

      * If any of the resistances are too high there's a foil damage and the phone is to be discarded.

- If the input voltage is correct, measure the output voltage (VSIMPAD, ~5V) at N705 pin 3 (class A, fig. 6.4).

  * If it's incorrect, replace N705.

  * If the output voltage is correct there can be a foil damage somewhere between N705 pin 3 and R724 or between N705 pin 3 and V700 pin 2 (fig. 6.2 and 6.4). If there's a foil damaged the phone is to be discarded.

## 6.4 VSIMPAD voltage is correct.

Open the phone and check for liquid damages.

Clean the SIM pads using alcohol and a brush.

Assemble the phone with a new SIM card holder and try again.

If the fault remains, disassemble the phone again.

Measure the resistance of R704 (class A, ~100 kohms, fig. 6.4).

Make sure pins 64 and 72-75 (fig. 6.3) are correctly soldered.

Measure the resistances of R600 (~33 ohms), R627 (~0 ohms) and R628 (~100 ohms, allof class A and in fig. 6.4).

Check the resistances from the marked side of R600 to X600 pad 2, from the marked side of R627 to X600 pad 3 and from the marked side of R628 to X600 pad 7 (all ~0 ohms and in fig. 6.3/6.4).

- If any of these resistances are too high there's a foil damage and the phone is to be discarded.
- If the resistances are correct, replace D600 (class B, fig. 6.3).

If the fault remains, send the phone to the next level.

# 7 Keyboard

## 7.1 Kind of keyboard fault.

Insert a SIM card and a fully charged battery into the phone. Start the phone by pressing the On/Off key.

- If it doesn't start at all, proceed to chapter 3 ("Doesn´tstart"-fault).

Press all the keys (including the volume keys at the side) and verify which are functional. Verification is most easily done like this:

1. Go to "key sound" in the menu. Choose "click".
2. Press the 1, 2, 3…*, 0, # keys. A clicking sound should be heard at every key pressed and the corresponding symbol should appear in the display.
3. Press the "Yes", "No", "clr", "<" and ">" keys. When pressing "Yes" the phone should attempt to place a call and when pressing "No" it should terminate it. The "clr" key erases the symbols in the display one by one and the "<" and ">" keys make you skim through the menu.
4. Press the volume keys on the side of the phone. A clicking sound should be heard for every press of the keys.

- If only the volume keys aren't functional, proceed to section 7.2.
- If one or more keys of the keyboard aren't functional, proceed to section 7.3.
- If one or both of the volume keys and one or more keys of the keyboard aren't functional, proceed to section 7.2 and then to section 7.3.

## 7.2 Volume keys aren't functional.

Open the phone and check for liquid damages, especially around the S820 and S821 switches (fig. 7.1).

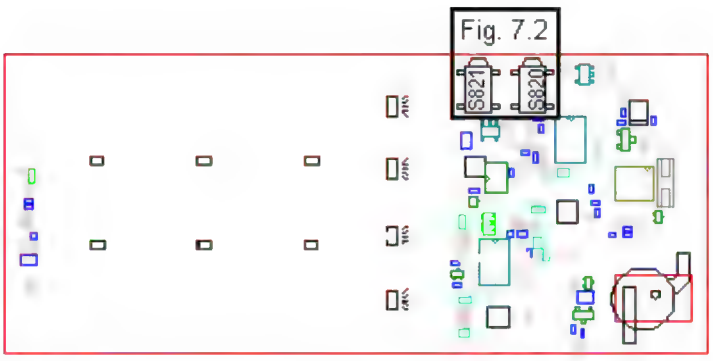



**Fig. 7.1**

Make sure the S820 and S821 (both of class A) switches are intact and correctly soldered.

Measure the resistance of the switch that isn't functional. You measure between pin 1/3 and 2/4 (fig. 7.2). The resistance should be >100 kohms when not pressed and ~0 ohms when pressed.

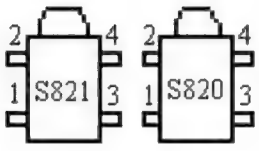



**Fig. 7.2**

- If the resistance is **high** all the time, replace the corresponding switch.
- If the resistance is **low** all the time, replace the corresponding switch first.
  * If that doesn't help, check the solderings at D600 pins 1, 123, 124 and 128.
  * If the solderings are correct, replace D600 (class B, fig. 7.3).

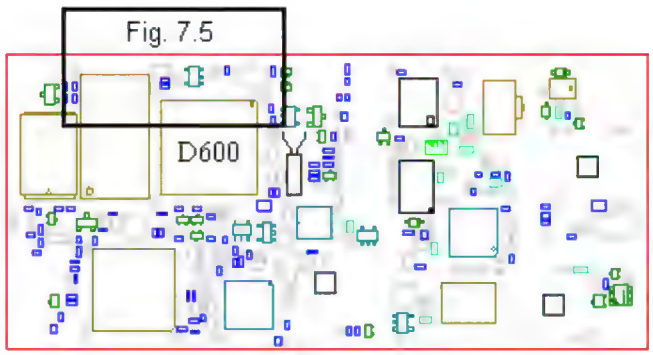



**Fig. 7.3**

- If the switches work as they should, replace the volume keys and try again.
  * If that doesn't help, check the solderings at D600 pins 1, 123, 124 and 128.
  * If the solderings are correct, replace D600 (class B, fig. 7.3).

## 7.3 One or more keys of the keyboard aren't functional.

Open the phone and check for liquid damages.

Remove the dome switches and check for liquid or mechanical damages, especially around the keys that aren't functional.

Clean the keypads **thoroughly**. Mount a new dome switches and make sure the keyboard isn't damaged. Assemble the phone and check the function of the keys as in 7.1.

If that doesn't help, open the phone. Give the board power and start it up (by pressing the On/Off key or setting DCIO high).

Schematic of the keyboard functions is shown in fig. 7.4.

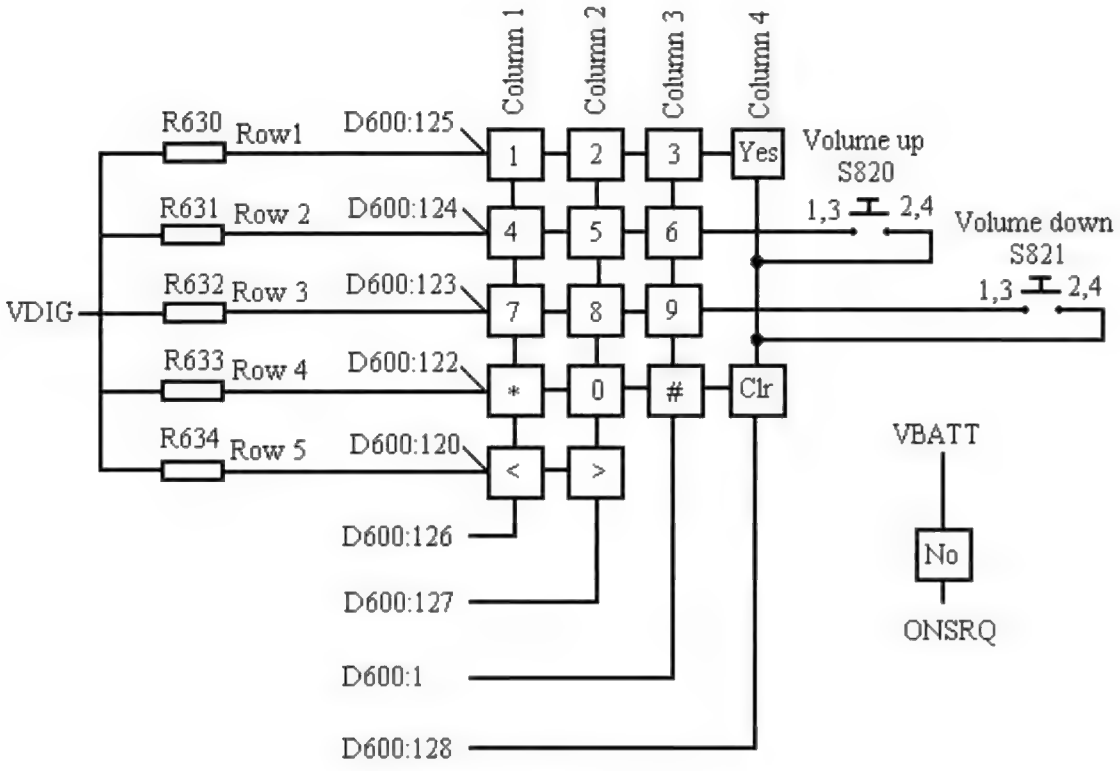



**Fig. 7.4**

Measure the VDIG voltage (fig. 7.5, ~3.2V).

- If it's incorrect, proceed to chapter 3 ("Doesn´t start"-fault).
- If the VDIG voltage is correct, check if there's voltage (~3.2V) at the marked sides of R630-R634 (fig. 7.5).

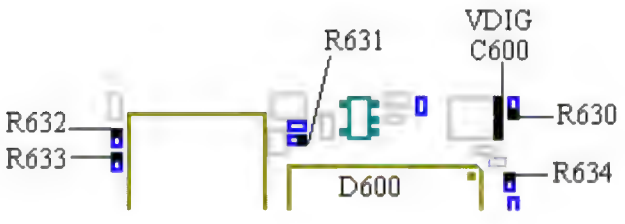



**Fig. 7.5**

* If the voltage is missing at one or more of the resistors, measure the resistance from the marked side of C600 to the marked side of the resistor in question (~0 ohms).

* If the resistance is too high there's a foil damage and the phone is to be discarded.

Measure the voltage at the unmarked side of the R630-R634 resistors (~3.2V).

- If the voltage is too low at one or more of the resistor, measure the resistance of the corresponding resistor (all are of class A and ~100 kohms).

  * If all the resistances are correct, check the solderings at D600 1, 120 and 122-128.

    * If the solderings are correct, replace D600 (class B, fig. 7.3).

- If the voltages at both sides of all the resistors are correct, but the keyboard isn't functional, check the solderings at D600 pin 1, 120 and 122-128.

  * If the solderings are correct, replace D600 (class B, fig. 7.3).

    * If it doesn't help replacing D600 remove the dome switches again. Check if there's VDIG (~3.2V) voltage at the marked sides of all the keypads in the row that isn't functional (fig. 7.6). Note that there's VBATT (~4.8V) voltage at the marked side of the "No" keypad.

      * If VBATT voltage is missing at the "No" keypad there's a foil damage and the phone is to be discarded.

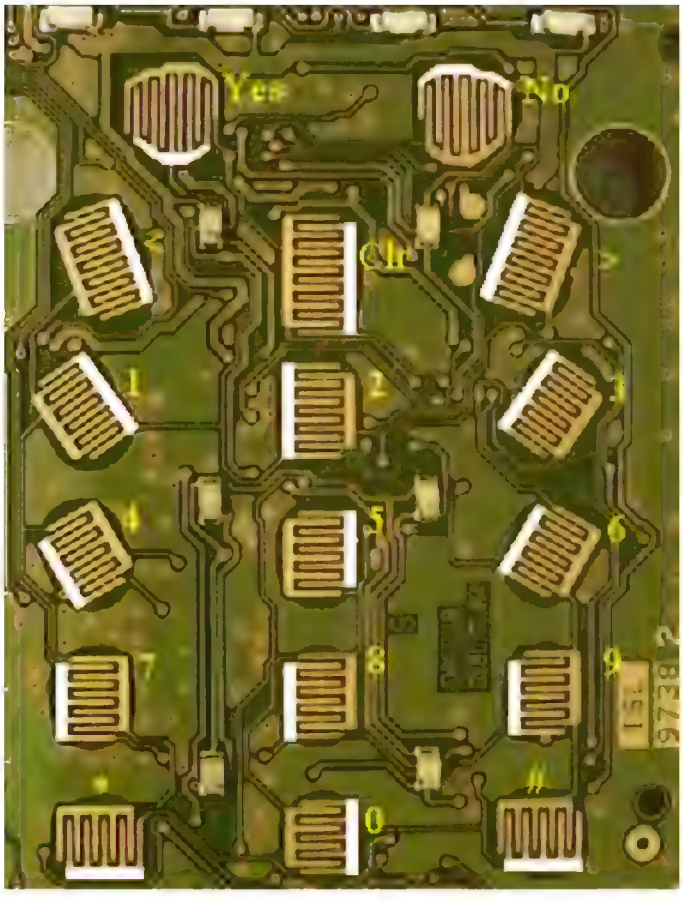



**Fig. 7.6**

* If the VDIG voltage is missing at a part of a row (as described in fig. 7.4) there's a foil damage and the phone is to be discarded. This can easily be verified by measuring the resistance from the marked side of a functional keypad to the marked side of a non-functional keypad (~0

ohms). The foil damage is most usually caused by liquid damages. If there, for instance, is voltage at the 4 and 5 keypads but not at the 6 and "volume up" keypads there's a foil damage somewhere between keypads 5 and 6 and the phone is to be discarded.

If a column or part of it isn't functional, check the solderings at D600 pins 1 and 120-128.

- If all the solderings are correct, replace D600 (class B).

# 8 Illumination and buzzer.

## 8.1 Type of fault.

Insert a dummy battery and a SIM card into the phone, press the On/Off key and wait for the phone to get serv (towards the net or a GSM test instrument).

- If the phone doesn't beep at start, go to "menu/ring level" and try to increase the ring level to full (not from full to step since that won't generate any sound). If the sound is faint or if you can't hear it at all, proceed to section 8.2
- If one or more of the LEDs at the display illumination isn't lit at start, proceed to section 8.3.
- If one or more of the LEDs at the keyboard illumination isn't lit at start, proceed to section 8.3.
- If the top indicator doesn't blink green when the phone has got serv, proceed to section 8.4.
- If the top indicator blinks green when the phone has got serv, lower the battery voltage to 4.2V. The top indicator should then start to blink red, the battery indicator should show an empty battery and the phone should warn with a beep.

  * If the battery indicator doesn't show an empty battery, the top indicator doesn't blink red and the phone doesn't warn with a beep the phone needs a voltage calibration.

  * If the top indicator doesn't blink red but the other things work, proceed to section 8.6.

  * If both the top indicators colours are faintly glowing and the buzzer sounds faintly, proceed to section 8.7.

## 8.2 Buzzer faint or dead.

Open the phone and check for liquid damages.

The front side of the circuit board is shown in fig. 8.1.

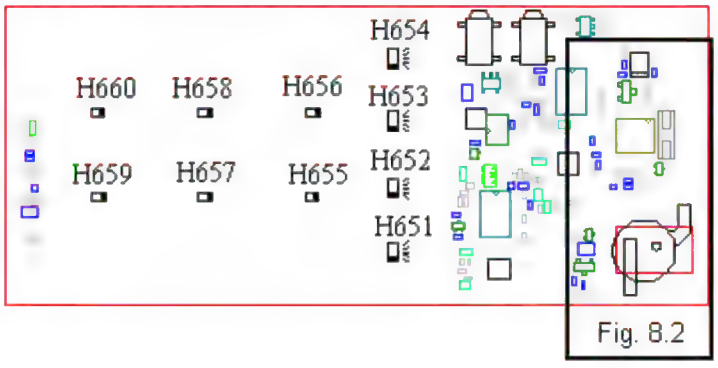



**Fig. 8.1**

Make sure the buzzer (H600, class A, fig. 8.2) is correctly soldered.

- If the solderings are correct, replace the buzzer.

Assemble the phone and try the buzzer as in 8.1 again.

- If the fault is repaired, send the phone through the normal flow.
- If the fault remains, open the phone. Give the board power and start it up.

Measure the voltage at H600 pad 4 (~3.4V, fig. 8.2).

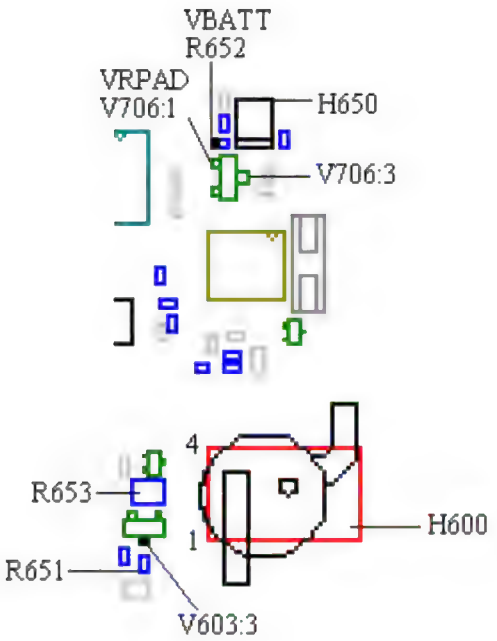



**Fig. 8.2**

- If the voltage at H600 pad 4 is missing, measure the VRPAD voltage (~3.8V) at V706 pin 1 (class A, fig. 8.2).

  * If the voltage at V706 pin 1 is missing, check if there's VRPAD voltage at N452 pin 5 (fig. 8.3).

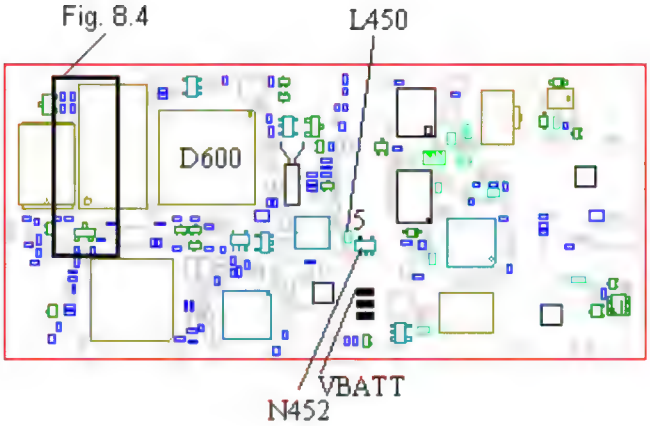



**Fig. 8.3**

* If the VRPAD voltage is faulty or missing, proceed to chapter 3 ("Doesn´t start"-fault).

* If it's correct, check the resistance from pin 2 of N452 to pin 1 of V706 (~0 ohms).

* If the resistance is too high it's probably the L450 (~0 ohms, class A, fig. 8.3) that's faulty.

* If L450 isn't faulty or incorrectly soldered there's a foil damage and the phone is to be discarded.

* If the VRPAD voltage at V706 is correct, measure the resistance from VBATT to V706 pin 3 (~4.7 ohms, fig. 8.3 and 8.2).

* If the resistance is too high it's probably R652 (~4.7 ohms, class A, fig. 8.2) that's faulty.

* If the resistor isn't faulty or incorrectly soldered there's a foil damage and the phone is to be discarded.

* If the resistance from VBATT to V706 is correct, replace V706 (class A).

- If the voltage at pad 4 of H600 is correct, measure the resistance from H600 pad 1 to V606 pin 3 (~0 ohms, fig. 8.2).

* If the resistance is too high it's probably R653 (~0 ohms, class A, fig. 8.2) that's faulty.

* If R653 isn't faulty or incorrectly soldered there's a foil damage and the phone is to be discarded.

* If the resistance is correct, make sure pin 91 of D600 (fig. 8.3) is correctly soldered.

* If it is correctly soldered, replace R651 (class A, fig. 8.3) and V606 (class A, fig. 8.2).

* If that doesn't help, replace D600 (class B, fig. 8.3).

If the fault remains, send the phone to the next level.

## 8.3 The background illumination for the display is missing or faintly glowing.

Open the phone and check for liquid damages.

Make sure all the LEDs (H651-H654, all of class A, fig. 8.1) are mounted and correctly soldered.

Give the board power and start it up by pressing the On/Off key (in the fixture or in the back cover with a dummy battery inserted, mount system connector to make the board lie steady in the back cover).

- If a few but not all of the LEDs aren't lit, replace them.
- If none of the LEDs are lit, measure the resistance of one of them.

  * If the resistance is ~0 ohms there's a short circuit in at least one of the LEDs. Remove them one at a time and measure the resistance after every LED removed. When the resistance increases the faulty LED has been removed.

  * If the resistance of the LEDs is high, make sure there's VBATT voltage at the marked side of the LEDs (fig. 8.1).

    * If VBATT voltage is missing it's likely due to liquid damage and the phone is to be discarded.

    * If the VBATT voltage is correct, check that R612 (~0 ohms, class A), R610 (~33 ohms, class A) and R611 (~0 ohms, class A, all in fig. 8.4) are mounted and of the correct resistance.

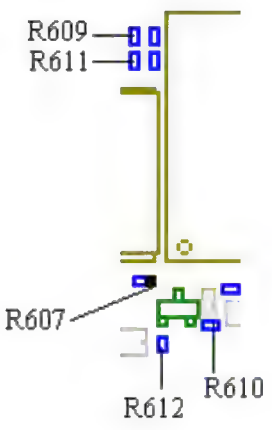



**Fig. 8.4**

Table 8.1 shows the symptoms when there's incorrect resistance in any of the resistors.

| Missing or broken. | H651-H654 | H655-H660 |
|---|---|---|
| R609 | Lit | Not lit |
| R610 | Not lit | Lit |
| R611 | Faintly glowing | Not lit |
| R612 | Not lit | Faintly glowing |

**Table 8.1**

- If none of the H651-H660 LEDs are lit, measure the voltage at the marked side of R607 (~3.1V, fig. 8.4). Before measuring you have to press a key for the processor to set the LED3K signal high for about 10s.

  * If the voltage is missing, make sure pin 92 of D600 (fig. 8.3) is correctly soldered.

    * If the soldering is correct, replace D600 (class B).

  * If the voltage is correct, replace R607 (class A).

If the fault remains, send the phone to the next level.

## 8.4 The background illumination for the keyboard is missing or is faintly glowing.

Open the phone and check for liquid damages.

Make sure all the LEDs (H655-H660, all of class A, fig. 8.1) are mounted and correctly soldered.

Give the board power and start it up by pressing the On/Off key (in the fixture or in the back cover with a dummy battery inserted, mount system connector to make the board lie steady in the back cover).

- If a few but not all of the LEDs aren't lit, replace them.
- If none of the LEDs are lit, make sure there's VBATT voltage at the marked side of the LEDs.

  * If VBATT is missing there's a foil damage, probably due to liquid damage, and the phone is to be discarded.

  * If VBATT is correct, make sure R612 (~0 ohms, class A), R609 (~33 ohms, class A) and R611 (~0 ohms, class A, all in Fig. 8.4) are mounted and of the

correct resistance. Table 8.1 shows the symptoms when there's incorrect resistance in any of the resistors.

- If none of the H651-H660 LEDs are lit, measure the voltage at the marked side of R607 (~3.1V, fig. 8.4). Before measuring you have to press a key for the processor to set the LED3K signal high for about 10s.

  * If the voltage is missing, make sure pin 92 of D600 (fig. 8.3) is correctly soldered.

    * If the soldering is correct, replace D600 (class B).

  * If the voltage is correct, replace R607 (class A).

If the fault remains, send the phone to the next level.

## 8.5 Green top indicator doesn't work.

Open the phone and check for liquid damages.

Make sure the double LED (H650, class A, fig. 8.2) is correctly soldered.

Give the board power and start it up by pressing the On/Off key.

Measure the voltage at pad 4 of H600 (~3.4V, fig. 8.2).

- If the voltage is missing, measure the VRPAD voltage (~3.8V) at pin 1 of V706 (class A, fig. 8.2).

  * If there's no voltage at pin 1 of V706, check if there's VRPAD voltage at pin 5 of N452 (fig. 8.3).

    * If the VRPAD voltage at pin 5 of N452 is incorrect, proceed to chapter 3 ("Doesn´t start"-fault).

    * If the voltage at N452 pin 5 is correct, measure the resistance from pin 5 of N452 to pin 1 of V706 (~0 ohms).

      * If the resistance is too high it's probably L450 (~0 ohms, class A, fig. 8.3) that's broken.

        * If L450 isn't faulty or incorrectly soldered there's a foil damage and the phone is to be discarded.

  * If the voltage at V706 pin 1 is correct, measure the resistance from VBATT to V706 pin 3 (~4.7 ohms, fig. 8.3 and 8.2).

    * If the resistance is too high it's probably R652 (~4.7 ohms, class A, fig. 8.2) that's faulty.

      * If R652 isn't faulty or incorrectly soldered there's a foil damage and the phone is to be discarded.

    * If the resistance from VBATT to pin 3 of V706 is correct, replace V706 (class A).

- If the voltage at H600 pad 4 is correct, check the soldering at pin 94 of D600.

If the fault remains, send the phone to the next level.

## 8.6 Red top indicator doesn't work.

Open the phone and check for liquid damages.

Make sure the double LED (H650, class A, fig. 8.2) is correctly soldered.

Give the board power and start it up by pressing the On/Off key.

Measure the voltage at pad 4 of H600 (~3.4V, fig. 8.2).

- If the voltage is missing, measure the VRPAD voltage (~3.8V) at pin 1 of V706 (class A, fig. 8.2).
  * If there's no voltage at pin 1 of V706, check if there's VRPAD voltage at pin 5 of N452 (fig. 8.3).
    * If the VRPAD voltage at pin 5 of N452 is incorrect, proceed to chapter 3 ("Doesn´t start"-fault).
    * If the voltage at N452 pin 5 is correct, measure the resistance from pin 5 of N452 to pin 1 of V706 (~0 ohms).
      * If the resistance is too high it's probably L450 (~0 ohms, class A, fig. 8.3) that's broken.
        * If L450 isn't faulty or incorrectly soldered there's a foil damage and the phone is to be discarded.
  * If the voltage at V706 pin 1 is correct, measure the resistance from VBATT to V706 pin 3 (~4.7 ohms, fig. 8.3 and 8.2).
    * If the resistance is too high it's probably R652 (~4.7 ohms, class A, fig. 8.2) that's faulty.
      * If R652 isn't faulty or incorrectly soldered there's a foil damage and the phone is to be discarded.
  * If the resistance from VBATT to pin 3 of V706 is correct, replace V706 (class A).
- If the voltage at H600 pad 4 is correct, check the soldering at pin 93 of D600.

If the fault remains, send the phone to the next level.

## 8.7 Both top indicator colours faintly glowing and buzzer sounds faintly.

Open the phone and check for liquid damages.

Give the board power and start it up.

Measure the VRPAD voltage (~3.8V) at V706 pin 1 (class A, fig. 8.2).

- If the VRPAD voltage is correct, replace V706 (class A).
- If the voltage is missing at V706, check if there's VRPAD voltage at pin 5 of N452 (fig. 8.3).

  * If it's incorrect or missing, proceed to chapter 3 ("Doesn´t start"-fault).

  * If the voltage at pin 5 of N452 is correct, check the resistance from N452 pin 5 top V706 pin 1 (~0 ohms, fig. 8.3 and 8.2).

    * If the resistance is too high it's probably L450 (~0 ohms, class A, fig. 8.3) that's broken.

      * If L450 isn't faulty or incorrectly soldered there's a foil damage and the phone is to be discarded.

If the fault remains, send the phone to the next level.

# 9 RTC

## 9.1 Determine the fault.

Insert a SIM card and a fully charged battery into the phone and start it up.

Set the correct time. Remove the battery and reinsert it after a minute.

- If the time says 00:00, proceed to section 9.2.

Compare to the correct time.

- If the clock is speeding or if it is halted, proceed to section 9.3.

The component side of the circuit board is shown in fig. 9.1.

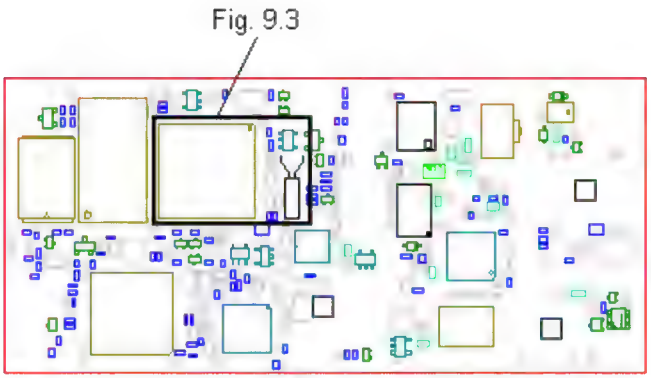



**Fig. 9.1**

## 9.2 The time says 00:00 after removing and reinserting the battery.

Open the phone and make sure the backup capacitor, C720 (class A, fig.9.2), is correctly soldered.

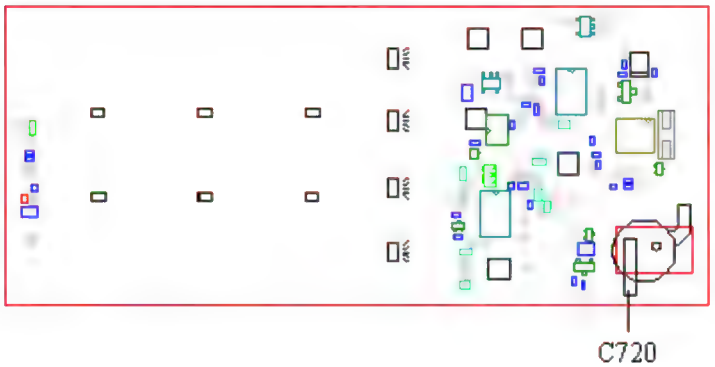



**Fig. 9.2**

- If it is, replace it.

Assemble the phone, start it up and set the correct time. Wait a few minutes for the backup capacitor to get charged. Remove the battery and reinsert it after a minute.

Check if the fault is fixed (the backup capacitor needs a few hours of charging to reach full capacity).

Compare to the correct time.

- If the clock is speeding or if it is halted, proceed to section 9.3.

## 9.3 The clock is speeding or it is halted.

Open the phone and make sure the B600 crystal is correctly soldered.

- If it is, replace B600, C690 and C691 (all of class A and in fig. 9.3).

Assemble the phone and compare to the correct time.

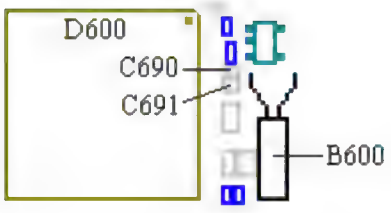



**Fig. 9.3**

# 10 Component lists

## 10.1 Explanations

### 10.1.1 Component list

**Position:**
The Components position number at the board

**Designation:**
Description of the component.

**Part No.:**
The components part number (or reference to Revision Change table) is specifed only if the component can be replaced with Standard Electrical Repair. Advanced means that the component can be replaced with Advanced Electrical Repair.

**Note:**
Functions that are affected if the component is replaced. The specified verification should be paid extra attention when testing the telephone.

**Trouble shooting instruction:** Means section in the Trouble shooting instruction. Not all components are mentioned in the Trouble shooting instruction.

### 10.1.2 Mounting drawing table

The Mounting drawings show the components placements (Pos) on the Printed Board. The Mounting drawings are not included in this document.

### 10.1.3 Revision change table

If there are multiple partnumbers for a position, this table specifies which one to use for different boards or board revisions.

# 10.2 Component list 2/ROA 117 3235/2

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| | DOME SWITCHES | SXA 120 9446 | | Doesn't start, Key-board |
| 2 | SHIELDING POT | Advanced | | |
| 3 | SHIELDING POT | Advanced | | |
| 4 | SHIELDING POT | Advanced | | |
| B551 | QUARTZ CRYS-TAL UNIT | Advanced | | |
| B600 | QUARTZ CRYS-TAL UNIT | RTM 501 661/01 | Verify Real Time Clock function | RTC |
| C104 | CAPACITOR | Advanced | | |
| C105 | CAPACITOR | Advanced | | |
| C106 | CAPACITOR | Advanced | | |
| C107 | CAPACITOR | Advanced | | |
| C111 | CAPACITOR | Advanced | | |
| C119 | CAPACITOR | Advanced | | |
| C202 | CAPACITOR | Advanced | | |
| C203 | CAPACITOR | Advanced | | |
| C204 | CAPACITOR | Advanced | | |
| C211 | CAPACITOR | Advanced | | |
| C212 | CAPACITOR | Advanced | | |
| C213 | CAPACITOR | Advanced | | |
| C214 | CAPACITOR | Advanced | | |
| C226 | CAPACITOR | Advanced | | |
| C227 | CAPACITOR | Advanced | | |
| C228 | CAPACITOR | Advanced | | |
| C230 | CAPACITOR | Advanced | | |
| C231 | CAPACITOR | Advanced | | |
| C235 | CAPACITOR | Advanced | | |
| C236 | CAPACITOR | Advanced | | |
| C242 | CAPACITOR | Advanced | | |
| C243 | CAPACITOR | Advanced | | |
| C250 | CAPACITOR | Advanced | | |
| C251 | CAPACITOR | Advanced | | |
| C252 | CAPACITOR | Advanced | | |
| C253 | CAPACITOR | Advanced | | |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| C254 | CAPACITOR | Advanced | | |
| C255 | CAPACITOR | Advanced | | |
| C256 | CAPACITOR | Advanced | | |
| C257 | CAPACITOR | Advanced | | |
| C258 | CAPACITOR | Advanced | | |
| C264 | CAPACITOR | Advanced | | |
| C300 | CAPACITOR | Advanced | | |
| C301 | CAPACITOR | Advanced | | |
| C302 | CAPACITOR | Advanced | | |
| C310 | CAPACITOR | Advanced | | |
| C311 | CAPACITOR | Advanced | | |
| C312 | CAPACITOR | Advanced | | |
| C315 | CAPACITOR | Advanced | | |
| C324 | CAPACITOR | Advanced | | |
| C350 | CAPACITOR | Advanced | | |
| C351 | CAPACITOR | Advanced | | |
| C352 | CAPACITOR | Advanced | | |
| C353 | CAPACITOR | Advanced | | |
| C354 | CAPACITOR | Advanced | | |
| C355 | CAPACITOR | Advanced | | |
| C356 | CAPACITOR | Advanced | | |
| C357 | CAPACITOR | Advanced | | |
| C358 | CAPACITOR | Advanced | | |
| C359 | CAPACITOR | Advanced | | |
| C360 | CAPACITOR | Advanced | | |
| C361 | CAPACITOR | Advanced | | |
| C371 | CAPACITOR | Advanced | | |
| C400 | CAPACITOR | Advanced | | |
| C401 | CAPACITOR | Advanced | | |
| C402 | CAPACITOR | Advanced | | |
| C403 | CAPACITOR | Advanced | | |
| C404 | CAPACITOR | Advanced | | |
| C406 | CAPACITOR | Advanced | | |
| C407 | CAPACITOR | Advanced | | |
| C410 | CAPACITOR | Advanced | | |
| C420 | CAPACITOR | Advanced | | |
| C430 | CAPACITOR | Advanced | | |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| C431 | CAPACITOR | Advanced | | |
| C432 | CAPACITOR | Advanced | | |
| C433 | CAPACITOR | Advanced | | |
| C450 | CAPACITOR | Advanced | | |
| C452 | CAPACITOR | Advanced | | |
| C453 | CAPACITOR | Advanced | | |
| C454 | CAPACITOR | Advanced | | |
| C455 | CAPACITOR | Advanced | | |
| C456 | CAPACITOR | Advanced | | |
| C457 | CAPACITOR | RJE 599 1107/47A | | |
| C458 | CAPACITOR | Advanced | | |
| C460 | CAPACITOR | Advanced | | |
| C461 | CAPACITOR | Advanced | | |
| C462 | CAPACITOR | RJC 464 3025/1 | | |
| C463 | CAPACITOR | Advanced | | |
| C468 | CAPACITOR | Advanced | | |
| C470 | CAPACITOR | Advanced | | |
| C501 | CAPACITOR | Advanced | | |
| C502 | CAPACITOR | Advanced | | |
| C503 | CAPACITOR | Advanced | | |
| C505 | CAPACITOR | Advanced | | |
| C507 | CAPACITOR | Advanced | | |
| C512 | CAPACITOR | Advanced | | |
| C513 | CAPACITOR | Advanced | | |
| C515 | CAPACITOR | Not available | | |
| C516 | CAPACITOR | Not available | | |
| C518 | CAPACITOR | Advanced | | |
| C520 | CAPACITOR | Advanced | | |
| C521 | CAPACITOR | Advanced | | |
| C530 | CAPACITOR | Advanced | | |
| C531 | CAPACITOR | Advanced | | |
| C532 | CAPACITOR | Advanced | | |
| C540 | CAPACITOR | Advanced | | |
| C541 | CAPACITOR | Advanced | | |
| C542 | CAPACITOR | Advanced | | |
| C543 | CAPACITOR | Advanced | | |
| C544 | CAPACITOR | Advanced | | |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| C545 | CAPACITOR | Advanced | | |
| C551 | CAPACITOR | Advanced | | |
| C553 | CAPACITOR | Advanced | | |
| C554 | CAPACITOR | Advanced | | |
| C556 | CAPACITOR | Advanced | | |
| C600 | CAPACITOR | RJE 599 1108/1W | | SIM, Keyboard, Display |
| C602 | CAPACITOR | RJC 464 3035/68 | | |
| C603 | CAPACITOR | RJC 464 3035/68 | | |
| C604 | CAPACITOR | RJC 464 3035/68 | | |
| C605 | CAPACITOR | RJC 464 3035/68 | | |
| C606 | CAPACITOR | RJC 464 3035/68 | | |
| C608 | CAPACITOR | RJC 464 3035/68 | | |
| C609 | CAPACITOR | RJC 464 3035/68 | | |
| C610 | CAPACITOR | RJC 464 3035/68 | | |
| C611 | CAPACITOR | RJC 464 3035/68 | | |
| C614 | CAPACITOR | RJC 496 2047/1 | | |
| C616 | CAPACITOR | RJC 464 3035/68 | | |
| C626 | CAPACITOR | RJC 464 3035/68 | Verify SIM function | |
| C627 | CAPACITOR | RJC 463 3022/1 | Verify SIM function | |
| C628 | CAPACITOR | RJC 463 3022/1 | Verify SIM function | |
| C629 | CAPACITOR | RJC 463 3022/1 | Verify SIM function | |
| C630 | CAPACITOR | RJC 463 3022/22 | Verify SIM function | |
| C631 | CAPACITOR | RJC 463 3022/33 | | |
| C632 | CAPACITOR | RJC 463 3022/56 | Verify display function | Display |
| C633 | CAPACITOR | RJC 464 3035/68 | Verify display function | Display |
| C635 | CAPACITOR | RJC 464 3035/68 | Verify SIM function | |
| C642 | CAPACITOR | RJC 464 3035/68 | | |
| C643 | CAPACITOR | RJC 463 3022/1 | | |
| C644 | CAPACITOR | RJC 463 3022/1 | | |
| C650 | CAPACITOR | RJC 463 3022/1 | | |
| C651 | CAPACITOR | RJC 463 3022/1 | | |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| C652 | CAPACITOR | RJC 463 3022/1 | | |
| C656 | CAPACITOR | RJC 463 3022/1 | | |
| C657 | CAPACITOR | RJC 463 3022/1 | | |
| C660 | CAPACITOR | RJC 463 3022/1 | | |
| C668 | CAPACITOR | RJC 464 3035/68 | | |
| C669 | CAPACITOR | RJC 463 3022/82 | | |
| C670 | CAPACITOR | See Rev.Change tab 1. | | |
| C672 | CAPACITOR | RJC 463 3022/82 | | |
| C673 | CAPACITOR | RJC 463 3022/1 | | |
| C675 | CAPACITOR | RJC 464 3035/68 | | |
| C676 | CAPACITOR | RJC 464 3025/1 | | |
| C677 | CAPACITOR | RJC 464 3025/1 | | |
| C678 | CAPACITOR | RJC 464 3025/1 | | |
| C679 | CAPACITOR | RJC 464 3024/1 | | |
| C680 | CAPACITOR | RJC 464 3023/68 | | Doesn't start |
| C690 | CAPACITOR | See Rev.Change tab 1. | Verify Real Time Clock function | RTC |
| C691 | CAPACITOR | See Rev.Change tab 1. | Verify Real Time Clock function | RTC |
| C692 | CAPACITOR | RJC 464 3035/68 | Verify Real Time Clock function | Doesn't start |
| C700 | CAPACITOR | RJC 463 3022/1 | | |
| C704 | CAPACITOR | RJC 463 3022/1 | | |
| C705 | CAPACITOR | RJC 464 3035/68 | Verify SIM function | |
| C706 | CAPACITOR | RJC 464 3047/1 | Verify SIM function | |
| C707 | CAPACITOR | RJE 599 2107/47A | Verify SIM function | |
| C708 | CAPACITOR | RJC 464 3046/1 | Verify SIM function | |
| C709 | CAPACITOR | RJC 464 3046/1 | Verify SIM function | |
| C710 | CAPACITOR | RJC 464 3046/1 | | Doesn't start |
| C711 | CAPACITOR | RJC 464 3025/1 | | |
| C719 | CAPACITOR | RJE 599 1167/1 | Verify Real Time Clock function | |
| C720 | CAPACITOR | RJE 338 1256/6 | Verify Real Time Clock function | RTC, Doesn't start |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| C721 | CAPACITOR | RJC 464 3035/68 | Verify Real Time Clock function | |
| C730 | CAPACITOR | RJC 464 3047/1 | Verify On/Off function | |
| C731 | CAPACITOR | RJC 464 3024/1 | Verify On/Off function | |
| C760 | CAPACITOR | RJC 464 3035/68 | | |
| C800 | CAPACITOR | RJE 599 1108/1W | | |
| C801 | CAPACITOR | RJC 463 3022/1 | | |
| C802 | CAPACITOR | RJC 464 3035/68 | | |
| C803 | CAPACITOR | RJC 464 3035/68 | | |
| C804 | CAPACITOR | RJC 464 3035/68 | | |
| C805 | CAPACITOR | RJC 464 3035/68 | | |
| C806 | CAPACITOR | RJC 464 3035/68 | | |
| C807 | CAPACITOR | RJC 464 3035/68 | | |
| C810 | CAPACITOR | RJC 464 3035/33 | Verify handsfree mic function | Audio |
| C812 | CAPACITOR | RJC 464 3035/68 | Verify handsfree mic function | Audio |
| C813 | CAPACITOR | RJE 599 2107/15 | Verify handsfree earphone function | Audio |
| C814 | CAPACITOR | RJE 599 2107/47A | Verify mic function | |
| C815 | CAPACITOR | RJC 463 3022/1 | Verify mic function | |
| C816 | CAPACITOR | RJC 464 3024/1 | Verify mic function | |
| C817 | CAPACITOR | RJC 463 3022/1 | Verify handsfree mic function | |
| C818 | CAPACITOR | RJC 464 3035/68 | Verify mic function | |
| C819 | CAPACITOR | RJC 464 3035/68 | Verify mic function | |
| C824 | CAPACITOR | RJC 464 3025/1 | Verify display function | Display |
| C826 | CAPACITOR | RJA 532 4055/12 | | |
| C829 | CAPACITOR | RJC 463 3022/1 | Verify mic function | |
| C830 | CAPACITOR | RJC 463 3022/1 | Verify mic function | |
| C833 | CAPACITOR | RJC 464 3035/68 | | |
| C835 | CAPACITOR | RJE 599 2107/47A | Verify handsfree mic function | Audio |
| C840 | CAPACITOR | RJC 463 3022/1 | | |
| C841 | CAPACITOR | RJC 463 3022/1 | | |
| C842 | CAPACITOR | RJC 463 3022/1 | | |
| C850 | CAPACITOR | RJC 464 3035/68 | Verify mic function | Audio |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| C851 | CAPACITOR | RJC 464 3035/68 | Verify mic function | Audio |
| C853 | CAPACITOR | RJC 464 3035/68 | | |
| C900 | CAPACITOR | RJE 599 1108/1W | | |
| C902 | CAPACITOR | RJC 464 3035/68 | | |
| C903 | CAPACITOR | RJC 464 3035/68 | | |
| C904 | CAPACITOR | RJC 464 3035/68 | | |
| C905 | CAPACITOR | RJC 464 3035/68 | | |
| C906 | CAPACITOR | RJC 464 3035/68 | | |
| D600 | MICROCIRCUIT | ROP 101 678/2C R2A | | SIM, Keyboard, Doesn't start, No serv, Display, Illumination and Buzzer, Audio |
| D610 | MICROCIRCUIT | RYT 118 6061/1 | | Doesn't start |
| D620 | MICROCIRCUIT | RYT 119 6047/1 | | Doesn't start |
| D630 | MICROCIRCUIT | Not available | | |
| D900 | FUNCTIONAL CIRCUIT | RYS 105 625/2C R4A | | Doesn't start |
| F601 | VARISTOR | See Rev.Change tab 1. | | |
| G300 | OSCILLATOR | Advanced | | |
| G350 | OSCILLATOR | Advanced | | |
| H600 | BUZZER | KLJ 107 11/1 | Verify buzzer function | Illumination and Buzzer |
| H650 | LIGHT EMITTING DIODE | RKZ 433 613/1 | Verify red/green top LED | |
| H651 | LIGHT EMITTING DIODE | RKZ 433 643/1 | Verify Illumination function | Illumination and Buzzer |
| H652 | LIGHT EMITTING DIODE | RKZ 433 643/1 | Verify Illumination function | Illumination and Buzzer |
| H653 | LIGHT EMITTING DIODE | RKZ 433 643/1 | Verify Illumination function | Illumination and Buzzer |
| H654 | LIGHT EMITTING DIODE | RKZ 433 643/1 | Verify Illumination function | Illumination and Buzzer |
| H655 | LIGHT EMITTING DIODE | RKZ 433 634/4 | Verify Illumination function | Illumination and Buzzer |
| H656 | LIGHT EMITTING DIODE | RKZ 433 634/4 | Verify Illumination function | Illumination and Buzzer |
| H657 | LIGHT EMITTING DIODE | RKZ 433 634/4 | Verify Illumination function | Illumination and Buzzer |
| H658 | LIGHT EMITTING DIODE | RKZ 433 634/4 | Verify Illumination function | Illumination and Buzzer |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| H659 | LIGHT EMIT-TING DIODE | RKZ 433 634/4 | Verify Illumination function | Illumination and Buzzer |
| H660 | LIGHT EMIT-TING DIODE | RKZ 433 634/4 | Verify Illumination function | Illumination and Buzzer |
| L211 | INDUCTOR | Advanced | | |
| L212 | INDUCTOR | Advanced | | |
| L213 | INDUCTOR | Advanced | | |
| L220 | INDUCTOR | Advanced | | |
| L250 | INDUCTOR | Advanced | | |
| L251 | INDUCTOR | Advanced | | |
| L252 | INDUCTOR | Advanced | | |
| L254 | TRANSFORMER | Advanced | | |
| L300 | FILTER | Advanced | | |
| L350 | INDUCTOR | Advanced | | |
| L351 | INDUCTOR | Advanced | | |
| L424 | INDUCTOR | Advanced | | |
| L450 | FILTER | REG 706 06/1 | | Illumination and Buzzer |
| L501 | FILTER | Advanced | | |
| L502 | INDUCTOR | Advanced | | |
| L503 | INDUCTOR | Advanced | | |
| L530 | INDUCTOR | Advanced | | |
| N200 | PROD. ADAPT. CIRCUIT | Advanced | | |
| N350 | MICROCIRCUIT | Advanced | | |
| N400 | POWER AMPLI-FIER | Advanced | | |
| N450 | PROD. ADAPT. CIRCUIT | Advanced | | |
| N451 | MICROCIRCUIT | Advanced | | Doesn't start |
| N452 | MICROCIRCUIT | RYT 113 6057/3 | | Doesn't start, Illumi-nation and Buzzer |
| N453 | MICROCIRCUIT | Advanced | | Doesn't start |
| N500 | PROD. ADAPT. CIRCUIT | Not available | | |
| N700 | MICROCIRCUIT | RYT 113 6057/4 | | Doesn't start, Dis-play |
| N701 | MICROCIRCUIT | RYT 113 6095/1 | | Doesn't start, Audio |
| N702 | MICROCIRCUIT | RYT 113 6095/1 | | SIM, Doesn't start, Display |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| N703 | MICROCIRCUIT | RYT 113 6040/5C | | Doesn't start |
| N705 | MICROCIRCUIT | RYT 113 048/C | Verify SIM function | SIM, Audio |
| N706 | MICROCIRCUIT | RYT 113 6071/5 | Verify Real Time Clock function | Doesn't start |
| N800 | PROD. ADAPT. CIRCUIT | Advanced | | Audio |
| R241 | RESISTOR | Advanced | | |
| R242 | RESISTOR | Advanced | | |
| R250 | RESISTOR | Advanced | | |
| R301 | RESISTOR | Advanced | | |
| R310 | RESISTOR | Advanced | | |
| R311 | RESISTOR | Advanced | | |
| R316 | RESISTOR | Advanced | | |
| R317 | RESISTOR | Advanced | | |
| R351 | RESISTOR | Advanced | | |
| R352 | RESISTOR | Advanced | | |
| R356 | RESISTOR | Advanced | | |
| R357 | RESISTOR | Advanced | | |
| R358 | RESISTOR | Advanced | | |
| R400 | RESISTOR | Advanced | | |
| R401 | RESISTOR | Advanced | | |
| R402 | RESISTOR | Advanced | | |
| R407 | RESISTOR | Advanced | | |
| R411 | RESISTOR | Advanced | | |
| R450 | RESISTOR | Advanced | | |
| R452 | RESISTOR | Advanced | | |
| R454 | RESISTOR | Advanced | | |
| R455 | RESISTOR | Advanced | | |
| R456 | RESISTOR | Advanced | | |
| R458 | RESISTOR | Advanced | | |
| R459 | RESISTOR | Advanced | | |
| R468 | RESISTOR | Advanced | | |
| R469 | RESISTOR | Advanced | | |
| R471 | RESISTOR | Advanced | | |
| R473 | RESISTOR | Advanced | | |
| R503 | RESISTOR | Advanced | | |
| R505 | RESISTOR | Advanced | | |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| R506 | RESISTOR | Not available | | |
| R521 | RESISTOR | Advanced | | |
| R553 | RESISTOR | Advanced | | |
| R562 | RESISTOR | Advanced | | |
| R600 | RESISTOR | REP 622 452/33 | Verify SIM function | SIM |
| R601 | RESISTOR | REP 622 454/1 | Verify portable handsfree function | Audio |
| R602 | RESISTOR | REP 622 453/47 | Verify vehicle handsfree function | |
| R604 | RESISTOR | REP 622 455/22 | Verify flash function | |
| R605 | RESISTOR | REP 622 454/1 | Verify vehicle handsfree function | Audio |
| R607 | RESISTOR | REP 622 454/1 | Verify Illumination function | Illumination and Buzzer |
| R608 | RESISTOR | REP 622 454/15 | Verify Illumination function | |
| R609 | RESISTOR | REP 622 452/33 | Verify Illumination function | Illumination and Buzzer |
| R610 | RESISTOR | REP 622 452/33 | Verify Illumination function | Illumination and Buzzer |
| R611 | RESISTOR | REP 622 001/0 | Verify Illumination function | Illumination and Buzzer |
| R612 | RESISTOR | REP 622 001/0 | Verify Illumination function | Illumination and Buzzer |
| R613 | RESISTOR | REP 622 455/1 | | |
| R615 | RESISTOR | REP 622 455/1 | Verify display function | Display |
| R616 | RESISTOR | REP 622 455/1 | Verify display function | Display |
| R617 | RESISTOR | REP 622 455/15 | | |
| R619 | RESISTOR | REP 622 454/22 | | Display |
| R620 | RESISTOR | REP 622 454/22 | | Display |
| R621 | RESISTOR | REP 622 455/1 | | |
| R622 | RESISTOR | REP 622 454/1 | Verify external equipment function | |
| R625 | RESISTOR | REP 622 453/47 | Verify external equipment function | |
| R626 | RESISTOR | REP 622 456/18 | Verify SIM function | |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| R627 | RESISTOR | REP 622 001/0 | Verify SIM function | SIM |
| R628 | RESISTOR | REP 622 453/1 | Verify SIM function | SIM |
| R629 | RESISTOR | REP 622 456/1 | | |
| R630 | RESISTOR | REP 622 456/1 | Verify keyboard function | Keyboard |
| R631 | RESISTOR | REP 622 456/1 | Verify keyboard function | Keyboard |
| R632 | RESISTOR | REP 622 456/1 | Verify keyboard function | Keyboard |
| R633 | RESISTOR | REP 622 456/1 | Verify keyboard function | Keyboard |
| R634 | RESISTOR | REP 622 456/1 | Verify keyboard function | Keyboard |
| R635 | RESISTOR | REP 622 455/22 | Verify vehicle handsfree function | Audio |
| R636 | RESISTOR | REP 622 455/22 | Verify portable handsfree function | Audio |
| R642 | RESISTOR | Advanced | | |
| R643 | RESISTOR | Advanced | | |
| R644 | RESISTOR | Advanced | | |
| R645 | RESISTOR | Advanced | | |
| R646 | RESISTOR | REP 622 453/33 | Verify green top LED | |
| R647 | RESISTOR | REP 622 453/33 | Verify red top LED | |
| R650 | RESISTOR | REP 622 456/1 | Verify external equipment function | |
| R651 | RESISTOR | REP 622 454/1 | Verify buzzer function | Illumination and Buzzer |
| R652 | RESISTOR | REP 622 451/47 | Verify buzzer function | Illumination and Buzzer |
| R653 | RESISTOR | REP 624 001/0 | Verify buzzer function | Illumination and Buzzer |
| R656 | RESISTOR | REP 622 001/0 | | |
| R700 | RESISTOR | REP 622 456/1 | Verify On/Off function | |
| R704 | RESISTOR | REP 622 456/1 | Verify SIM function | |
| R706 | RESISTOR | REP 622 451/47 | Verify SIM function | SIM |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| R708 | RESISTOR | REP 622 456/1 | Verify On/Off function | |
| R709 | RESISTOR | REP 622 454/47 | Verify On/Off function | |
| R710 | RESISTOR | REP 622 656/1 | | |
| R711 | RESISTOR | REP 622 656/1 | | |
| R719 | RESISTOR | REP 622 455/47 | Verify Real Time Clock function | |
| R720 | RESISTOR | REP 622 456/18 | Verify Real Time Clock function | |
| R724 | RESISTOR | REP 624 652/47 | Verify external equipment function | SIM |
| R725 | RESISTOR | REP 622 456/1 | | |
| R802 | RESISTOR | REP 622 654/39 | Verify handsfree mic function | Audio |
| R803 | RESISTOR | REP 622 453/1 | Verify handsfree earphone function | Audio |
| R804 | RESISTOR | REP 622 456/1 | Verify handsfree earphone function | Audio |
| R805 | RESISTOR | REP 622 655/15 | Verify handsfree mic function | Audio |
| R807 | RESISTOR | REP 622 655/68 | Verify display function | |
| R808 | RESISTOR | REP 622 656/1 | Verify display function | |
| R812 | RESISTOR | REP 622 653/47 | Verify mic function | |
| R814 | RESISTOR | REP 622 653/47 | Verify mic function | |
| R815 | RESISTOR | REP 622 656/1 | | |
| R816 | RESISTOR | REP 622 453/47 | Verify mic function | Audio |
| R817 | RESISTOR | REP 622 454/1 | Verify mic function | Audio |
| R818 | RESISTOR | REP 622 455/22 | Verify mic function | |
| R819 | RESISTOR | REP 622 454/1 | Verify mic function | Audio |
| R820 | RESISTOR | REP 622 653/47 | Verify mic function | |
| R822 | RESISTOR | REP 622 456/1 | | |
| R823 | RESISTOR | REP 622 456/1 | | |
| R825 | RESISTOR | REP 622 654/33 | Verify handsfree mic function | Audio |
| R830 | RESISTOR | REP 622 453/47 | Verify handsfree mic function | Audio |
| R831 | RESISTOR | REP 622 455/1 | | |
| R832 | THERMISTOR | REZ 401 055/1 | | |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| R900 | RESISTOR | REP 622 455/1 | | |
| R901 | RESISTOR | REP 622 455/1 | | |
| R902 | RESISTOR | REP 622 455/1 | | |
| R903 | RESISTOR | REP 622 455/1 | | |
| R904 | RESISTOR | REP 622 454/1 | | |
| R905 | RESISTOR | REP 622 455/1 | | |
| R907 | RESISTOR | REP 622 456/1 | | |
| R908 | RESISTOR | REP 622 456/1 | | |
| R909 | RESISTOR | REP 622 456/1 | | |
| R910 | RESISTOR | REP 622 455/1 | | |
| S820 | PUSH-BUTTON SWITCH2 | RMD 955 101/01 | | Keyboard |
| S821 | PUSH-BUTTON SWITCH2 | RMD 955 101/01 | | Keyboard |
| U200 | TRANSFORMER | Advanced | | |
| U201 | TRANSFORMER | Advanced | | |
| V300 | TRANSISTOR | Advanced | | |
| V301 | TRANSISTOR | Advanced | | |
| V302 | TRANSISTOR | Advanced | | |
| V350 | TRANSISTOR | Advanced | | |
| V351 | TRANSISTOR | Advanced | | |
| V420 | DIODE | Advanced | | |
| V421 | DIODE | Advanced | | |
| V430 | TRANSISTOR | Advanced | | |
| V450 | TRANSISTOR | Advanced | | |
| V452 | TRANSISTOR | Advanced | | |
| V552 | DIODE | Advanced | | |
| V605 | DIODE | RKZ 123 647/1 | Verify buzzer function | |
| V606 | TRANSISTOR | RYN 121 6086/1 | Verify buzzer function | Illumination and Buzzer |
| V607 | TRANSISTOR | RYN 121 6069/1 | Verify flash function | |
| V608 | DIODE | RKZ 123 646/1 | Verify display function | Display |
| V609 | DIODE | RKZ 323 673/1 | Verify SIM function | |
| V613 | TRANSISTOR | RYN 121 6086/1 | Verify Illumination function | |

| Positon | Designation | Part No. | NOTE | Trouble shooting instruction |
|---|---|---|---|---|
| V614 | TRANSISTOR | RYN 121 6086/1 | Verify Illumination function | |
| V700 | TRANSISTOR | RYN 122 625/1 | Verify SIM function | SIM |
| V701 | TRANSISTOR | RYN 121 6069/1 | Verify On/Off function | |
| V702 | DIODE | RKZ 123 647/1 | Verify On/Off function | Doesn't start |
| V703 | TRANSISTOR | RYN 121 6069/1 | | |
| V704 | TRANSISTOR | RYN 120 647/1 | Verify On/Off function | Doesn't start |
| V705 | TRANSISTOR | RYN 120 647/1 | Verify SIM function | |
| V706 | TRANSISTOR | RYN 121 6086/1 | Verify buzzer function | Illumination and Buzzer |
| V708 | TRANSISTOR | RYN 121 6069/1 | Verify On/Off function | Doesn't start |
| V709 | TRANSISTOR | RYN 121 6069/1 | Verify On/Off function | Doesn't start |
| V711 | DIODE | RKZ 123 647/1 | Verify Real Time Clock function | Doesn't start |
| V805 | DIODE | RKZ 123 646/2 | Verify mic function | |
| X810 | CONNECTOR2 | SXA 120 5152 | | Audio |
| Z200 | FILTER | Advanced | | |
| Z201 | FILTER | Advanced | | |
| Z400 | FILTER | Advanced | | |
| Z500 | FILTER | Advanced | | |

## 10.3 Mounting drawing table

| | | | |
|---|---|---|---|
| Board part nr | 2/ROA 117 3235/2 | R1A, R1B, R2A, R2B, R3A | R4A, R4B, R4C. |
| Mounting drawing | 1078-2/ROA 117 3235/2 | Rev C | Rev E |

## 10.4 Revision change table

### 10.4.1 Rev. change tab 1

| Pos | 2/ROA 117 3235/2<br>R-state | Part number |
|---|---|---|
| C670 | up to R4B | not mounted |
| | R4C | RJC 463 3022/1 |
| C690 | up to R4B | RJC 463 3022/1 |
| | R4C | RJC 463 3022/12 |
| C691 | up to R4B | RJC 463 3022/1 |
| | R4C | RJC 463 3022/12 |
| F601 | up to R4A | REY 203 03/3 |
| | R4B, R4C | REY 203 08/1 |